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The successful management of a normal pregnancy and labour is a subject to which an increasing amount of attention has been directed in recent years, and is a matter that concerns both the physician and the obstetrician.

When pregnancy is complicated by chronic heart disease, it is of considerable importance that an attempt should be made to estimate the capacity of the patient's heart in relation to the increased strain on her cardiovascular system consequent on pregnancy. Upon the power of adjustment of the heart may depend the successful delivery of a living child and the prevention of serious complications in the mother, as well as the maintenance of the patient's health so that she is able to lead as nearly a normal life as possible.

A patient with valvular disease of the heart may seek advice from a doctor as to the advisability of pregnancy and the risks involved in both pregnancy and labour. The enlarged uterus and the extra placental circulation required to maintain adequate nutrition of the fœtus will throw an increased burden on an already damaged heart; moreover, labour and the puerperium with the possible demands of lactation will also tax the resources of an inadequate cardiovascular system. Such things as the condition of the myocardium, as shown by exercise tolerance, congestive heart failure and the size of the heart, will have to be carefully investigated, since each of these may have an important bearing on the prognosis.

It is the purpose of this paper to show the effect of pregnancy and labour on women suffering from valvular disease of the heart with normal rhythm. The problem is approached from the point of view of the physician, who is concerned not merely with the care of the patient during her pregnancy but with her subsequent medical history. For this purpose a series of 100 cases has been recorded, in which the patient and her cardiac condition have been kept under observation for periods varying from two to four years. Whilst this series was being collected, only one case of auricular fibrillation was found; it was, therefore, decided to omit this case, and to present this series as one of 100 cases of normal rhythm. It may be remarked in passing that this percentage of cases of auricular fibrillation (1 per cent.) is abnormally low when compared with series recorded by other observers.

The cases for observation were taken in order of their attendance at the antenatal and the medical out-patient department of University College Hospital, and the main object of the investigation was to complete a follow-up of the cases over a period of at least two years. Actually only 3 cases were lost sight of, whilst 20 patients have been followed up for four or more years.

Of the various papers published on the subject during the last ten years, reference will be made only to those in which histories of the patients have been followed up for a period of some months or years.

In 1926 a report on a group of 156 cases, mainly from Guy's Hospital, which had been investigated by Hunt, was published after his death by Campbell. Hunt had followed up 98 of these patients after delivery; he attached considerable importance to the size of the heart, and he also found that auricular fibrillation was a disastrous complication of heart disease in pregnancy.

Corwin, Herrick, Valentine, and Wilson (1927) carried out an analysis of 196 cases of valvular disease of the heart in pregnancy among patients attending the Sloane Hospital, New York, including an investigation of the after-histories of 109 cases over periods varying from two months to two years. Their investigation was mainly directed towards the effect of the cardiac condition on the management of pregnancy and labour, rather than a consideration of the subsequent medical history.

McIlroy and Rendel (1931) published a very full and comprehensive paper on their observations on 200 cases, mainly from the obstetrical point of view. They were of the opinion that multiple pregnancies tended to lower the cardiac efficiency permanently. They found that the anatomical lesion appeared to have little bearing on the prognosis. They stressed the functional efficiency of the heart as a factor of importance.

Crighton Bramwell (1931) presented a paper before the Royal Society of Medicine recording the results of an investigation of 82 cases carefully observed and followed up. In 1935 he published a second paper, in which the number of cases had been increased to 300—this included the original 82 cases. Of these cases 95 out of the first 150 had been followed up for various periods up to five years. He found that patients admitted as emergencies were in a more serious condition (9 deaths out of 13 cases) than those who had been under medical supervision in the antenatal department (only 8 deaths out of 287). When first seen 21 had congestive heart failure, and the prognosis in cases with this complication was grave. There was auricular fibrillation in 16 (5·3 per cent.), and this was a serious complication. Concerning the degree of cardiac enlargement, Bramwell stated that the bigger the heart the smaller the reserve, and that other things being equal the presence of great cardiac enlargement added to the seriousness of the prognosis. He did not think that the type of valvular lesion offered any help in the prognosis. The outlook was worse in the first pregnancy than in other pregnancies; the mortality for the whole series was 5·7 per cent., but in primiparæ the death-rate was 9 per cent. compared with 2·6 per cent. in multiparæ. He stressed the great value of adequate antenatal supervision.

The mortality in the above-mentioned series varied from 2·5 per cent. (McIlroy and Rendel) to 11 per cent. (Hunt).

The incidence of congestive heart failure in the published series also varies considerably. This difference can be easily accounted for, since in some papers the figures are based on the number of patients showing congestive failure on admission, whereas in others, all cases developing congestive failure during the course of the pregnancy are included. Thus, Bramwell found 21 out of 300 (7 per cent.) had congestive heart failure at the time of their first attendance; whereas McIlroy and Rendel found that congestive heart failure occurred in the course of pregnancies on 51 occasions in 226 patients (22·5 per cent.).

Ætiology

The 100 cases in this series are examples of chronic valvular disease of the heart with the exception of one patient, who was admitted as a cardiac case but who gave no history of rheumatic fever: she was found to have free aortic regurgitation due to a streptococcal endocarditis, arising from pyorrhœa.

In the whole series 65 per cent. were definitely rheumatic. Of these, 35 patients gave a history of previous attacks of rheumatic fever, of whom 5 had additional

symptoms; 2 had had severe or frequent attacks of tonsillitis, 2 had suffered from growing pains in childhood, and 1 had had both growing pains and tonsillitis. There were 12 patients who had suffered from both rheumatic fever and chorea. The remaining 18 gave a history of chorea, of whom 1 had also had growing pains and 3 had had tonsillitis.

A group of 16 patients gave a history of conditions not infrequently rheumatic in origin. Of these, 11 had had tonsillitis, 3 had suffered from tonsillitis and growing pains, and 2 from growing pains only. If these cases are included with the cases of rheumatic fever and chorea, the total would be 81 per cent.

The remaining 19 patients gave no history of previous rheumatic fever, chorea, growing pains or tonsillitis.

This series may, therefore, be taken as fairly representative of an average series of cases of valvular disease of the heart among young adults. No definite difference in the prognosis or in the subsequent course was found between the rheumatic and non-rheumatic group. Moreover, in the 18 cases of congestive heart failure, the same proportion of rheumatic and non-rheumatic cases was maintained—namely, 66·7 per cent. (12 out of 18 cases) as compared with 65 per cent. for the whole series.

The Heart

Valve lesions.—On considering the type of valve lesion occurring in the series, 81 cases of mitral stenosis, unaccompanied by other valve lesions, 13 cases of mitral stenosis and aortic regurgitation, and 6 cases of aortic regurgitation alone were found. There was an associated high blood pressure in 3 of these cases, 2 of whom died, one of cerebral hæmorrhage and the other of cerebral thrombosis complicating congestive heart failure. No difference was found in prognosis between cases of mitral stenosis and those of aortic regurgitation or those in whom both these lesions were present.

The *size of the heart* has been carefully estimated at the time of the patient's first visit during the pregnancy and has been reviewed at intervals after delivery. In all cases where there seemed to be any doubt as to the size of the heart, a radiogram at two metres or an orthodiagram has been taken. The cases have been divided into two groups:—

(1) Those having little or no clinical enlargement.
(2) Those having moderate or considerable enlargement.

The death-rate was higher in the second group than in the first, the mortality being 16·3 per cent. (7 out of 43 cases) as compared with 9·1 per cent. (7 out of 77 cases). A comparison of the results at the end of two years revealed that the cases with little or no clinical enlargement did slightly better than the others. Out of the former group 55·8 per cent. were unchanged—i.e., either free of symptoms or in statu quo—but only 35·9 per cent. of the latter group were unchanged at the end of two years. Thus patients in whom the heart was not clinically or only slightly enlarged did a little better than those in whom moderate or considerable enlargement was present.

In any group of patients in whom valvular disease is present, however, similar results would be obtained when the cases are followed up over a period of two years. Although the size of the heart is helpful in the prognosis of any cardiac case, it should not be unduly stressed in estimating the risk of pregnancy in a patient with valvular disease.

Exercise Tolerance

The history of each patient has been carefully investigated; special attention has been paid to the amount of work and exercise that the patient has been able to undertake before she became pregnant and also during the early months of her pregnancy. In the case of the multipara, inquiry has been made into the previous history of her former pregnancies and labours, and the time of breakdown of exercise tolerance, if any, in relation to the stage of the pregnancy. A simple exercise-tolerance test has been used in these patients to control conclusions arrived at from the history given; it was essential that the exercise should be simple and easily carried out in view of the pregnancy. The method adopted has been to make the patient sit up and down and to touch her toes ten times, whilst on the examination couch; the pulse- and respiration-rates have been counted immediately before and after the exercise and again after two minutes' rest in the supine position.

The exercise tolerance has been investigated at the time of the first examination during the pregnancy and subsequently at each attendance in the out-patient department after delivery—i.e., at six months, one year, and two years. The alteration in the patient's exercise tolerance existing at the end of two years after delivery has been found to be almost invariably the same as that found at six months after delivery. This was so in 73 out of 85 cases (85·9 per cent.) seen at both six months and two years; 2 of the remaining 12 were better and the other 10 were worse at two years than at six months after delivery.

Three patients (Cases 1, 2, and 3), who gave a history of earlier and earlier breakdown of exercise tolerance in successive pregnancies, did badly; two (Cases 2 and 3) developing congestive heart failure and one (Case 1B) dying soon after delivery. The following is a typical example of such a case:—

Case 3 first came under observation during her third pregnancy. Her first pregnancy was seven years previously, when she had been confined to bed for two months after delivery owing to dyspnœa, although there had been no shortness of breath during the course of the pregnancy. Five years ago she had her second pregnancy and dyspnœa commenced in the 6th month. During the third pregnancy her exercise tolerance broke down at the 3rd month and congestive heart failure developed in the 9th month.

Three patients (Cases 4A, 5, and 6A), who gave a history of early onset of dyspnœa and failure of exercise tolerance during the first pregnancy, developed congestive heart failure during the second pregnancy. Two more patients (Cases 7 and 8), who gave a similar history of early exercise-tolerance breakdown, died soon after labour, one after the second pregnancy and the other shortly after the first labour.

From observation of these cases it seems that (1) early breakdown of exercise tolerance in a primipara is a grave sign—accordingly, a careful investigation of the history of the patient's exercise tolerance during the early months of her pregnancy is of great value; and (2) in multiparæ, the experience derived from the previous pregnancies is of great value, since the breakdown of exercise tolerance earlier and earlier in each successive pregnancy is a serious feature.

Congestive Heart Failure

Of the 100 patients 18 developed congestive heart failure during the course of the pregnancy; in one patient congestive failure occurred in both her pregnancies, so that the incidence was 19 in 120 pregnancies (15·8 per cent.). No patient in this series died during pregnancy or labour; but during the period following delivery when they were under observation, the mortality for those patients was

22·2 per cent. (4 out of 18 cases); whereas in those who had not had congestive failure the mortality was only 12·2 per cent. (10 out of 82 patients). The mortality was higher when congestive heart failure occurred during the course of the first pregnancy than when it developed in a multipara. There were 5 primigravidæ who went into congestive failure, and 2 (40 per cent.) subsequently died; 14 multiparæ had congestive failure during the course of the pregnancy, and 2 (14 per cent.) have since died.

Congestive heart failure has been found to appear at any time during the course of the pregnancy, having been seen in the earliest stages and also just at full term. The relationship between the time of onset and the subsequent prognosis of the case has been considered, and the following results have been noted.

In 8 of the 19 cases congestive failure developed early* in the pregnancy, whilst in the remaining 11, congestive failure came on in the later half of the pregnancy. In the latter group 6 of the patients gave a history of early breakdown of exercise tolerance, although the congestive failure did not occur till late, but in the remaining 5 it was impossible to say whether the exercise tolerance broke down early or late in the pregnancy, since the history given by the patient was too indefinite.

None of the group of 8 patients, in whom congestive failure developed early, went to full term: 1 had a spontaneous abortion, 2 were induced, and the remaining 5 had hysterotomy performed. From the cardiac aspect all these patients did well with the exception of the patient who had a spontaneous abortion in her second pregnancy*; she died in congestive heart failure, having had failure also in her first pregnancy. It is probable that the successful results in these patients depended largely upon the treatment adopted in each case. When congestive heart failure developed towards the end of pregnancy the patients did badly, 3 out of the 11 dying shortly after delivery.

If the patient was admitted to hospital in time to enable suitable therapeutic measures and rest to be carried out before delivery, and if as a result she was no longer in congestive failure, the prognosis became more favourable. Thus only 1 patient died out of the 11 in whom congestive failure had disappeared at the time of delivery, whereas 3 died out of 7 patients in whom delivery took place while signs of congestive failure were still present.

Occasionally cases occur in which congestive heart failure does not react to appropriate medical treatment. In the later months this may be the result of the mechanical effect of pressure by an enlarged uterus interfering with the normal action of the heart and lungs. In the earlier months, however, this mechanical factor is not present and the congestive heart failure must result from the extra load thrown upon the heart from the vascular changes occurring in the enlarging uterus. This is supported by a case in this series, in which progressive congestive failure in the early months of pregnancy cleared up rapidly after artificial termination.

Case 2 was admitted to hospital in 5th month of pregnancy in congestive heart failure; after 8 weeks of treatment it was decided to induce premature labour at the 31st week of pregnancy, since the congestive failure was progressive. After delivery she made an excellent recovery, and the congestive failure rapidly cleared up. She was alive but worse 4 years after delivery.

It is fairly widely held (Pardee 1922, Corwin et al. 1927) that induction of abortion or premature labour during congestive heart failure almost invariably leads to a fatal result. Two cases in this series were induced in such circumstances; both survived and lived for more than two years. One (Case 2) has just been described, the other is the following:—

Case 9, primigravida, first entered hospital at 3rd month of pregnancy with congestive heart failure; she failed to react to treatment, and as the congestive failure was increasing, induction was carried out at 27th week. The progress of the congestive failure was arrested but did not clear up. She was readmitted 2½ years later, twenty weeks' pregnant, since she was still in congestive failure. She died 13 days after spontaneous abortion.

Two other patients in whom congestive heart failure was present in one pregnancy subsequently became pregnant again; both cases went through the next pregnancy and were successfully delivered at full term without the development of congestive failure (Cases 5 and 10). This was attributed to earlier and better supervision during the antenatal period owing to the experience gained during the conduct of the former pregnancy.

Since the onset of congestive heart failure was a serious feature during the course of pregnancy, the previous history of those patients who developed congestive failure was investigated. Short intervals between pregnancies seemed to be a factor in the production, since in 5 out of 6 multiparæ the interval between the former pregnancy and the one in which congestive failure developed was under two years. The length of time between the pregnancy in which congestive failure occurred and the rheumatic infection which may have caused the heart lesion (when known) did not appear to have any significance. Early breakdown of exercise tolerance was important. In 3 cases in which exercise tolerance broke down early in the first pregnancy congestive failure developed in the second pregnancy (Cases 4A, 5, and 6A). Of 9 patients who had had several children, 3 gave a clear history of earlier and earlier breakdown of exercise tolerance in former pregnancies, and developed congestive failure in the pregnancy during which they came under observation.

The incidence of premature delivery was 42·9 per cent. in those cases who had had congestive heart failure during pregnancy, being much greater than in those who did not have failure (14·6 per cent.). The incidence of premature delivery in the whole series was 16·5 per cent.†

Follow-up Results

All cases have been examined personally at 6 months, 1 year, and 2 years after delivery. Those patients who did not attend for various reasons, such as change of address, were traced by the lady almoner and the district midwives, to whom I am greatly indebted for this assistance. In 5 cases a personal visit was made to the patient's house and the patient examined in her own home. Only 3 out of the 100 patients have been lost sight of over a period of 2 to 4 years.

In this way 97 cases were successfully kept under observation. Of the 3 cases who were lost sight of, two could not be traced and one was known to be alive and doing her housework 3 years after delivery, but refused any examination; she had, however, been examined 1½ years after labour and was then free of symptoms.

The mortality in this series was 14 per cent.; no patient died during the pregnancy or labour (Table I). The number of deaths recorded here is high when compared with the results of other* observers,

* Early pregnancy has been taken as the 1st to 4th month; late pregnancy from the 5th month to full term.

† It has generally been stated that the incidence of premature delivery is high in cardiac cases. Recent figures have been given by Corwin et al. (1927) 16·3 per cent., Lennie (1927) 18 per cent., and Bramwell (1935) 37 per cent.

because the period of observation has been longer than in many of the series hitherto published, and also because the total has included 4 non-cardiac deaths. These 4 deaths were due to cerebro-spinal meningitis (Case 14A), influenzal septicæmia (Case 13), septic peritonitis (Case 12), and rupture of the aorta

TABLE I—*Deaths*

Case No.	Valve. lesion	CHF.	Treatment.	Date of death.	PM.	Cause of death.
			A.—NON-CARDIAC DEATHS			
11	MS.	0	1st, normal labour. 2nd, spontaneous premature labour.	1½ yrs. 3rd day.	Yes.	Rupture of normal aorta.
12	„	0	Hysterotomy at 26th wk.	4th day.	No.	Septic peritonitis.
13	„	0	Normal labour.	17th day.	No.	Influenza vera and streptococcal septicæmia.
14	„	0	1st } normal 2nd } labour.	1 yr. 2nd day.	No.	Cerebro-spinal meningitis.
			B.—DEATHS DURING PUERPERIUM			
1	MS and AR.	0	1st, forceps at full term. 2nd } normal 3rd } labour.	3½ yrs. 1½ yrs. 1½ mths.	No.	CHF.
15	MS.	+	Cæsarean section.	6th day.	No.	Post-operative broncho-pneumonia.
16	MS and AR.	0	Delivery of breech by intra-uterine manipulations.	3 hrs.	Yes.	Post-partum hæmorrhage and shock.
17	„	+	Forceps at full term.	7th wk.	No.	CHF.
18	AR.	0	Normal labour.	8th day.	Yes.	Acute infective endocarditis.
			C.—OTHER DEATHS			
7	MS.	0	Manual rotation and forceps.	6½ mths.	Yes.	Acute heart failure.
8	MS.	+	Normal labour.	2nd mth.	Yes.	CHF.
9	„	+	1st, induction at 27th wk. 2nd, spontaneous abortion at 20th wk.	2½ yrs. 13th day.	Yes.	CHF.
19	MS and HBP.	0	Normal labour.	6½ mths.	Yes.	Cerebral hæmorrhage.
21	AR and HBP.	0	Induction at 12th wk.	4 mths.	Yes.	Cerebral thrombosis.

MS. = Mitral stenosis. AR. = Aortic regurgitation.
HBP. = High blood pressure. CHF. = Congestive heart failure.
PM. = Post-mortem examination.

(Case 11A); in the latter the aorta was quite healthy and the rupture was in no way connected with the cardiac condition. The puerperal mortality—i.e., deaths occurring within six weeks of delivery—excluding those who died of non-cardiac causes, was only 5 per cent. (Cases 1B, 15, 16, 17, 18).

The patients who were still alive at the end of 2 or 4 years have been placed in three groups: those who were free of all symptoms (10 cases), others in whom the cardiovascular system seemed unchanged (35 cases), and the remainder who were definitely worse after than before the pregnancy (38 cases). These results were arrived at by carefully comparing the condition of the heart and the results of the exercise-tolerance tests, as well as the patient's history, at the time of the final examination, with the notes made at the time of the first examination. The results are shown in Table II; it will be seen that just half of the whole series were worse or dead at the end of two years.

TABLE II—*Results of Follow-up*

—	Total (100).	At 2 yrs.	At 4 yrs.
Free of symptoms ..	11*	10	0
Unchanged	37†	25	10
Worse	38	28	10
Dead	14	12	2

* Includes 1 lost sight of at 1½ years.
† Includes 2 lost sight of, at 1 and at 1½ years respectively.

Summaries of Cases Quoted

CASE 1

FIRST PREGNANCY.—Primipara aged 22. *Heart:* Fair exercise tolerance; not clinically enlarged; M.S. and A.R.‡; rheumatic fever at 16 years. *Course:* A few attacks of paroxysmal tachycardia. *Delivery:* Forceps at full term owing to paroxysmal tachycardia during labour; female child, 6 lb. 10 oz. *Follow-up:* Pregnant again.

A. SECOND PREGNANCY.—*Course:* 8 or 9 attacks of paroxysmal tachycardia. *Delivery:* Normal labour at full term; female child, 7 lb. 1½ oz. *Follow-up:* Pregnant again.

B. THIRD PREGNANCY.—*Course:* Frequent attacks of paroxysmal tachycardia. *Delivery:* Normal labour; premature female child, 6 lb. *Death:* At home from C.H.F. at 1½ months after this and at 3½ years after first labour.

CASE 2

Aged 34; 3-para. *Heart:* C.H.F. developed at 4th month; slightly enlarged; M.S.; rheumatic fever and chorea at 10 years. *Course:* C.H.F. did not clear up with rest, &c. *Delivery:* Induction of labour at 31st week. *Follow-up:* C.H.F. cleared up rapidly after delivery. Sterilisation at 6th month after labour. At 4 years, worse.

CASE 3

Aged 34; 3-para. *Heart:* C.H.F. at 8½ months; moderately enlarged; M.S.; no rheumatic history. *Course:* C.H.F. not quite cleared up at time of labour. *Delivery:* Normal labour at full term; female child, 5 lb. 15 oz. *Follow-up:* At 4 years, worse.

CASE 4

FIRST PREGNANCY.—Primipara aged 27. *Heart:* Poor exercise tolerance; slightly enlarged; M.S.; chorea at 7 years. *Delivery:* Normal labour; premature male child, 6 lb. 2 oz. *Follow-up:* Pregnant again.

A. SECOND PREGNANCY.—*Course:* During this pregnancy developed C.H.F. at 8th month. C.H.F. cleared by time of operation. *Delivery:* Cæsarean section and sterilisation at full term; male child, 6 lb. 1 oz. *Follow-up:* At 2½ years after former labour, worse.

CASE 5

FIRST PREGNANCY.—Aged 25; 2-para. *Heart:* Poor exercise tolerance; moderately enlarged; M.S.; growing pains as a child. *Course:* C.H.F. developed at 8th month, gone at full term; exercise tolerance broke down at 3rd month. *Delivery:* Normal labour at full term; male child, 5 lb. 10 oz. *Follow-up:* Pregnant again.

A. SECOND PREGNANCY.—*Course:* No C.H.F. during this pregnancy. *Delivery:* Normal labour at full term; male child, 7 lb. 3 oz. *Follow-up:* At 2½ years after former labour, worse.

CASE 6

FIRST PREGNANCY.—Primipara aged 35. *Heart:* Good exercise tolerance; not clinically enlarged; M.S.; rheumatic fever at 15 years. *Delivery:* Breech delivery

‡ Abbreviations as in Table I.

at full term; male child, 5 lb. 2 oz. *Follow-up:* Pregnant again.

A. SECOND PREGNANCY.—*Course:* C.H.F. at 3rd month, clearing up by time of operation. *Delivery:* Hysterotomy and sterilisation at 4th month. *Follow-up:* At 2¾ years after this and at 3½ years after former delivery, worse.

CASE 7

Aged 23; 2-para. *Heart:* Very poor exercise tolerance; moderately enlarged; M.S.; chorea at 13 years. *Delivery:* Manual rotation and forceps; premature male child. *Death:* At 6th month, acute heart failure. P.M.

CASE 8

Primipara aged 25. *Heart:* Poor exercise tolerance; slightly enlarged; M.S.; no rheumatic history. *Course:* Exercise tolerance broke down at start of pregnancy; C.H.F. developed at full term. *Delivery:* Normal labour at full term; male child, 5 lb. 1 oz. *Death:* At 2nd month, C.H.F. P.M.

CASE 9

FIRST PREGNANCY.—Primipara aged 24. *Heart:* C.H.F. at 2nd month; slightly enlarged; M.S.; chorea at 7 and 14 years. *Course:* C.H.F. progressive in spite of rest, &c. *Delivery:* Induction of labour at 27th week. *Follow-up:* Pregnant again.

A. SECOND PREGNANCY.—*Course:* C.H.F. had persisted since 1st pregnancy. *Delivery:* Spontaneous abortion at 20th week. *Death:* At 2½ years after 1st delivery and on 13th day after abortion, from C.H.F. P.M.

CASE 10

FIRST PREGNANCY.—Aged 36; 5-para. *Heart:* C.H.F. at 8th month; moderately enlarged; M.S.; rheumatic fever at 12 years. *Course:* C.H.F. cleared up by delivery. *Delivery:* Normal labour; premature female child. *Follow-up:* Pregnant again.

A. SECOND PREGNANCY.—*Course:* No C.H.F. during this pregnancy. *Delivery:* Normal labour at full term; dead female child, 5 lb. 11 oz. *Follow-up:* At 4 years after this and 5½ years after former labour, worse.

Conclusions

1. A hundred cases of pregnant women suffering from valvular disease of the heart with normal rhythm have been examined during pregnancy. Only 3 cases have been subsequently lost sight of; the remainder have been kept under observation for at least 2 years after delivery, and of these, 20 have been followed up for 4 or more years. No case died during the course of the pregnancy or labour.

2. In the management of a case a careful investigation of the history of the patient's exercise tolerance before and during the early months of the pregnancy is of great importance. Early breakdown of exercise tolerance in a primipara is a grave sign, since death may occur soon after labour or congestive heart failure is likely to supervene with its attendant grave risks. In multiparæ the experience derived from the previous pregnancies is of great value, since the breakdown of exercise tolerance earlier and earlier in each successive pregnancy is a serious feature for the same reason.

3. The appearance of congestive heart failure is serious in a pregnant patient with cardiac disease. The subsequent mortality was greater in those patients in whom this occurred than in those in whom it did not, and particularly in the primipara. Where congestive failure developed early in the pregnancy the cases did well, possibly as a result of obstetrical treatment; those in whom the failure developed late did badly, particularly if the failure had not cleared up at the time of delivery. A short interval between pregnancies increases the risk of congestive failure in a cardiac case. The incidence of premature delivery was much increased in cases developing congestive failure during pregnancy, whereas it was not increased in the other cardiac cases.

4. Cases with slight or no enlargement of the heart did better than those with moderate or considerable enlargement. There appeared to be no difference in the prognosis between cases of mitral stenosis, those of aortic regurgitation, and those in whom both these lesions were present.

5. Pregnancy is contra-indicated in those cases of heart disease with normal rhythm, who have ever had congestive failure, in whom the exercise tolerance broke down early in a previous pregnancy, or where the heart is considerably enlarged. Where congestive failure appears early in the course of a pregnancy, termination by emptying the uterus should be undertaken as soon as the failure has been relieved by rest and other medical measures. During the pregnancy careful supervision and increased rest with admission to hospital for at least two weeks before the onset of labour is necessary for the successful management of a case of heart disease complicating pregnancy.

I am greatly indebted to Prof. F. J. Browne, director of the Obstetric Unit, and his staff, and to Sir Thomas Lewis and the physicians of University College Hospital, for leave to examine and follow-up this series of patients. I also wish to thank Sir Thomas Lewis for his encouragement and advice throughout this investigation.

REFERENCES

Bramwell, J. C. (1931) *Proc. R. Soc. Med.* **24**, 709.
— (1935) *Lancet*, **1**, 629.
Corwin, J., Herrick, W. W., Valentine, M., and Wilson, J. M. (1927) *Amer. J. Obstet. Gynec.* **13**, 617.
Hunt, G. H. (1926) *Guy's Hosp. Rep.* **76**, 135.
Lennie, R. A. (1927) *J. Obstet. Gynæc.* **34**, 331.
McIlroy, L., and Rendel, O. (1931) *Ibid*, **38**, 7.
Pardee, H. E. B. (1922) *Amer. J. med. Sci.* **164**, 847.

THE CHEMOTHERAPY OF TYPHOID AND SOME OTHER NON-STREPTOCOCCAL INFECTIONS IN MICE

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FOLLOWING the work of Domagk (1935) on Prontosil, *p*-aminobenzenesulphonamide was shown to be effective in the treatment of mice against intraperitoneal infection by streptococci (Tréfouël, J. and Mme., Nitti and Bovet 1936; Buttle, Gray, and Stephenson 1936; Colebrook and Kenny 1936) and meningococci (Buttle et al. 1936; Proom 1937).

In this paper we describe the results obtained in treating mice infected with various other organisms—viz., *Bacterium typhosum*, *Bact. paratyphosum* B, *Bact. aertrycke*, pneumococcus, Friedländer's bacillus, and pasteurella. The degree of protection is also compared with that previously reported from the Wellcome Physiological Research Laboratories for the hæmolytic streptococcus and the meningoccus.

TECHNIQUE

Infection of Mice.—A number of strains of each organism were obtained, and the most virulent selected for this investigation. All the organisms were grown for 18 hours in the medium described by O'Meara and Brown (1936) the cultures were diluted in broth and 0·5 or 1·0 c.cm

amounts injected intraperitoneally into mice of 25 to 30 grammes in weight. Dilutions of some of the strains were also made in 5 per cent. mucin, using a method similar to that of Miller and Castles (1936) in their work on the titration of antimeningococcus serum. The mucin produced a considerable diminution in the minimal fatal dose, an observation which has already been made by Miller (1935) for the meningococcus, and by Rake (1935) for *Bact. typhosum*. The virulence of the strains tended to decrease when they were kept on artificial media, but was restored to some extent by mouse passage.

Treatment with the Sulphonamide.—The drug was given to the mice by mouth in suspension with gum acacia using a 1 c.cm. syringe with a blunted needle. In preliminary experiments on dosage a single injection of 100 mg. was tolerated by mice of 25 to 30 g., but produced a temporary paralysis with incoördinate movements of the limbs which lasted four to five hours. Doses of 40 mg. and 25 mg. were therefore used for the present investigation and produced no symptoms.

The general scheme of treatment was to give one group of mice a single injection of the drug, and a second group injections twice daily, commencing treatment in each case immediately after infection. A third group received their first treatment five hours after infection, and thereafter two doses a day as for the second group.

TABLE I

Treatment of Mice Infected with Bact. typhosum (" *Rawlings* "—*rejuvenated*)

Treatment with the sulphonamide.	Approx. number of organisms in infecting dose.*	Number of mice (out of groups of 10) dying on each day after infection.				Mice surviving 12 days.
		1st	2nd	3rd	6th	
ORGANISMS INJECTED WITHOUT MUCIN						
None.	50,000	..	..	..	..	10
	500,000	5	5	..	..	0
	5,000,000	10	..	..	..	0
25 mg. twice daily.	5,000,000	..	..	..	..	10
	50,000,000	1	1	..	..	8
	500,000,000	10	..	..	..	0
Single dose (25 mg.).	5,000,000	..	2	..	..	8
	50,000,000	1	2	..	..	7
25 mg. twice daily (first dose delayed 5 hours).	5,000,000	2	..	1	..	7
	50,000,000	7	1	..	2	0
ORGANISMS INJECTED IN SUSPENSION WITH MUCIN†						
None.	50	3	1	..	..	6
	5,000	7	2	1	..	0
	500,000	10	..	..	..	0
25 mg. twice daily.	5,000	..	..	..	..	10
	500,000	..	..	..	..	10
	50,000,000	6	3	1	..	0

*As judged by opacity method, checked by serial dilutions in Wright's broth and colony counts on Wright's agar plates.

† Ten mice injected with mucin alone, and 10 mice injected with mucin and treated with the sulphonamide, all survived.

BACT. TYPHOSUM

Three strains were used of approximately equal virulence—viz., " Rawlings " (rejuvenated), " Allahabad," and " Mrs. S.," all of which were kindly supplied by Major J. S. Boyd, R.A.M.C. Experiments have been made, with and without mucin, a typical protocol (strain " Rawlings ") being shown in Table I.

In the first section of the experiment, no mucin was used to enhance virulence. Of 20 treated mice (2 groups of 10 animals infected with 50 million organisms and treated immediately) 15 were alive twelve days after the injection of 100 times the number of organisms (500 thousand) required to kill all 10 control mice. In the second section, in which mucin was used as a diluent for the culture, protection was obtained against a slightly larger number of fatal doses; a group of 10 treated mice, injected with 10 thousand times the number of organisms required to kill 4 of 10 controls, all survived for twelve days. (In another experiment treated mice were kept for one month, and no deaths occurred after the twelfth day.)

A single dose of 25 mg. of the sulphonamide was almost as effective as doses of 25 mg. repeated twice daily for 6 days. When treatment was delayed for five hours after infection, the result was not as good as with immediate treatment, although some protection was still demonstrable.

In these experiments we were able to isolate *Bact. typhosum* from the heart blood, spleen, and, less often, the kidney of some apparently healthy mice one week after infection and treatment. After one month a positive culture was obtained from the spleen of one of twelve mice examined, and serum tests sometimes showed the presence of agglutinins. We also found that treated mice which survived seemed to possess slight active immunity to a second infecting dose one to four weeks later. (This phenomenon has not been observed in experiments on the treatment of hæmolytic streptococcal infections in mice.)

BACT. PARATYPHOSUM

Bact. paratyphosum A strains were not used since those available were of relatively low virulence.

We tested two recently isolated, highly virulent *paratyphosum* B strains which Prof. Hedley Wright kindly sent us. It was unnecessary to use mucin as 500 organisms killed 60, and sometimes 100, per cent. of mice within 48 hours of infection. Protection was obtained against 100 to 1000 fatal doses, when treatment with the drug was either a single dose given immediately after infection, or a similar dose repeated twice daily. " Delayed treatment " was less effective than immediate treatment. The majority of the deaths occurred before the third day of observation, irrespective of the method of treatment.

BACT. AERTRYCKE

Altogether six strains were used, three of which were isolated from guinea-pigs, one from a mouse, and two from human subjects. We are indebted to Prof. W. W. C. Topley for two of the strains, and to Dr. F. A. Knott for one. Suspensions in 5 per cent. mucin of all the cultures were virulent for mice, and gave very similar results with treatment.

A single dose of the sulphonamide produced a slight, but definite, retardation in the time of death. When administration of the drug was " delayed for five hours " after infection and repeated twice daily, the treated mice survived for only two to three days longer than the controls.

The best effect was obtained with repeated doses of the sulphonamide (Table II), but even here the protection was only temporary. Treatment produced delay in the time of death of mice infected with a large dose of culture (10,000 fatal doses), but the majority of these animals died within a few days of the controls. Only some of the mice infected with approximately one fatal dose could be kept alive for twelve days.

The *Bact. aertrycke* survived for several days in treated mice; although the mice appeared healthy, the blood, spleen, and gall-bladder all gave a growth of the organism seven days after infection, and a positive culture was obtained from the spleen of one animal which had survived for eighteen days.

TABLE II

Treatment of Mice Infected with Bact. aertrycke (*with Mucin**)

Treatment with the sulphonamide.	Approx. number of organisms in infecting dose.	Number of mice (out of groups of 10) dying on each day after infection.							Mice surviving 12 days.
		1st	2nd	3rd	4th	5th	6th	7th–12th	
GUINEA-PIG STRAIN, Q.626									
None.	5,000	5	2	2	..	..	1	..	0
	500,000	9	1	..	..	..	..	..	0
40 mg. twice daily.	5,000	..	..	..	2	..	..	..	8
	500,000	..	..	..	..	3	..	4	3
HUMAN STRAIN, A.6									
None.	50	1	5	..	1	3	..	..	0
	500,000	9	1	..	..	..	..	..	..
25 mg. twice daily.	50	..	..	..	..	..	..	6	4
	500,000	..	..	..	2	5	1	2	0

* Ten mice injected with mucin alone and 10 mice injected with mucin and treated with the sulphonamide all survived.

FRIEDLÄNDER'S BACILLUS

One strain of exceptional virulence was selected from a series sent from the National Collection of Type Cultures through the courtesy of Dr. St. John Brooks. A protocol of a typical experiment made with this strain is appended (Table III). The outstanding feature was that frequent doses of the sulphonamide gave temporary protection only. Although, at an early stage of the experiment, mice infected with 10,000 fatal doses appeared healthy, it was only those animals which had received approximately one fatal dose which survived for twelve days.

TABLE III

Treatment of Mice Infected with Friedländer's Bacillus (*Strain* 12). (*Without Mucin*)

Treatment with the sulphonamide.	Approx. number of organisms in infecting dose.	Number of mice (out of groups of 10) dying on each day after infection.							Mice surviving 12 days.
		1st	2nd	3rd	4th	5th	6th	7th–12th	
None.	1	..	..	1	5	..	..	..	4
	10	..	1	5	4	..	..	..	0
	100	4	6	..	..	..	..	..	0
	1,000	9	1	..	..	..	..	..	0
25 mg. twice daily.	1	..	..	..	..	..	..	..	10
	10	..	1	..	1	1	..	5	2
	100	..	..	1	4	2	3	..	0
	1,000	..	1	2	7	..	..	..	0
	10,000	..	..	10	..	..	..	..	0
	100,000	1	..	9	..	..	..	..	0
	1,000,000	1	6	3	..	..	..	..	0

It is probable that the infection produced in mice by a number of other members of the genus bacterium may be influenced by the sulphonamide. Since this paper was written, slight protection was obtained against a Gram-negative, slow lactose-fermenting bacillus, which was highly virulent for mice. It was isolated by Dr. David Haler from a case of adult dysentery, but does not conform to any of the recognised features of the dysentery group. Dr. Haler informs us that a similar organism is sometimes associated with pyelitis and with infantile dysentery.

PNEUMOCOCCUS

It has already been reported (Buttle et al. 1936) that the sulphonamide has little effect in the protection of mice against infections by the pneumococcus, Type I. In view of the effect obtained against other infections by repeating the doses of sulphonamide at short intervals, experiments on the treatment of pneumococcal infections were resumed.

In the control series, groups of 6 mice were killed within forty-eight hours by infecting doses of approximately 5 pneumococci, Type I. Groups of treated mice (40 mg. twice daily) infected with 5 and 500 pneumococci appeared healthy for the first three days, but some deaths were observed on the fourth day, and by the twelfth day all the mice had died.

The experiment was repeated with another virulent strain of pneumococcus, Type II. The time of death of the treated mice was delayed a little longer than in the case of the infection with the Type I strain.

Rosenthal (1937) studied the effect of the sulphonamide on mouse infections with a number of pneumococcal strains of Types I, II, and III. He reported that 25 to 50 per cent. of the treated mice survived for seven days, and, in the case of one strain, 86 to 100 per cent. of mice were cured. The sulphonamide was injected subcutaneously in emulsion with olive oil. It is possible that strain variation may explain the difference between Rosenthal's results and ours, although another factor may have been the method of administration of the drug.

PASTEURELLA

Preliminary work would suggest that the drug has a temporary and very slight beneficial effect against infections with *Past. pseudotuberculosis* and *Past. septica*. Further experiments are projected, in view of the relationship between these organisms and *Past. pestis*.*

Effect of the Sulphonamide in vitro

Only three of the above organisms have been studied so far—viz., *Bact. aertrycke*, *Bact. typhosum*, and pneumococcus.

BACT. AERTRYCKE

The inhibitory effect of *p*-aminobenzenesulphonamide on the rate of growth of this organism in culture medium in vitro is not nearly so great as that found with the streptococcus (Colebrook, Buttle, and O'Meara 1936). An inoculum of approximately 8 organisms of our guinea-pig strain, Q.626, grows in the broth medium described by Wright (1933), and the addition of 0·1 per cent. of the sulphonamide does not inhibit the growth appreciably (see also Nitti, Bovet, and Depierre 1937). If the tubes are incubated anaerobically, however, the addition of 0·1 per cent. sulphonamide inhibits growth for sixteen hours.

If the organisms are grown in defibrinated human blood (G. A. H. B.), and incubated in slowly rotating tubes, it is necessary to use an inoculum of 1,000,000 organisms in 0·5 c.cm. of blood to obtain growth (an inoculum of 100,000 organisms is destroyed by the blood itself). The addition of 0·04 per cent. of the sulphonamide to the blood produces a slight bactericidal effect; 1,000,000 organisms are destroyed, but there is no appreciable effect on an inoculum of 10,000,000 organisms. If the leucocytes are removed from the blood by the method described by Fleming (1926), the addition of 0·04 per cent. of the sulphonamide does not influence the growth of an inoculum of 1,000,000 organisms. With streptococci, on the other hand, the addition of 0·01 per cent. of the sulphonamide considerably delayed the growth of the cocci even in blood from which the leucocytes had been removed. As the sulphonamide produces so little inhibition of growth of

* *Staphylococcus*.—Since this paper went to press we have tested for virulence a number of strains of staphylococcus isolated from bovine and canine sources by Prof. F. C. Minett. One bovine strain was of exceptional virulence, mice being killed within 48 hours by approximately 50 organisms suspended in mucin. Treated mice that had received 1000 fatal doses survived for upwards of 12 days. In our previous work with a large number of human strains we did not find any organisms of sufficient mouse-virulence to enable us to demonstrate any degree of protection.

Bact. aertrycke in culture medium or in deleucocyted blood it seems possible that, in whole blood, it may act by rendering the organisms more susceptible to phagocytosis (see also Long and Bliss 1937).

The effect of the sulphonamide on the growth of *Bact. aertrycke* in vitro appeared to be so slight that experiments have been carried out to determine whether there was any other factor contributing towards the recovery of the treated mice.

The serum taken from two treated mice seven days after infection did not agglutinate *Bact. aertrycke*. Treated mice which had survived for two weeks were just as susceptible as normal mice to a further injection of culture.

In another experiment, a group of six mice was injected intraperitoneally with the soluble polysaccharide prepared by Prof. Topley, from the mouse strain of *Bact. aertrycke* and very kindly sent to us for the investigation; a second group of 6 mice, similarly injected with the polysaccharide was treated with the sulphonamide, and a third group received mixtures of the sulphonamide and the polysaccharide. The mice in the treated groups died at the same time as the controls which had not received the sulphonamide.

BACT. TYPHOSUM

The results of tests with this organism were similar to those obtained with *Bact. aertrycke*. In preliminary experiments the drug produced little inhibition of growth in broth, whereas a definite bactericidal action was demonstrable in defibrinated whole blood. An inoculum of 100,000 organisms grew in normal blood, whereas in blood containing 0·04 per cent. of the sulphonamide 1,000,000 organisms were killed, and 10,000,000 were inhibited for 18 hours.

PNEUMOCOCCUS

Although the treatment of pneumococcal infections in the mouse is even less effective than the treatment of *Bact. aertrycke* infections, the inhibition of growth of the pneumococcus, Type I, in a broth medium is nearly as great as that obtained with the hæmolytic streptococcus, and very much greater than that with *Bact. aertrycke*. Thus, 0·01 per cent. of the sulphonamide prevents the growth of 50 pneumococci in broth, while 0·1 per cent. of the sulphonamide is almost without effect on the growth of a smaller inoculum of *Bact. aertrycke*. If, however, the pneumococci are grown in defibrinated human blood (G. A. H. B.), incubated in slowly rotating tubes, the effect of the sulphonamide is only very slight. The cocci grow in twenty-four hours from a very small inoculum—3 organisms—with or without the addition of 0·01 per cent. of the sulphonamide; the growth in the blood containing the sulphonamide, however, is not as rapid as in the controls. The results of experiments in vivo, therefore, correspond more closely with those obtained in vitro in blood than with those in culture medium.

The above results of in-vitro tests are of a preliminary nature, only one strain of each of these organisms having been tried with the blood of two individuals. Further work is clearly necessary on the action of the sulphonamide on several strains of organisms in vitro in the blood of different individuals.

Discussion

The foregoing experiments show that the early oral administration of *p*-aminobenzenesulphonamide prevents or delays the development of septicæmia and death in mice infected with a number of different organisms. An attempt has been made to summarise the available data in Table IV; earlier results with the hæmolytic streptococcus and meningococcus are included for purposes of comparison. It is emphasised that the figures are only approximations and depend to some extent on the virulence of the organisms used.

It will be seen that there are three grades of protection. In the first group, intensive treatment with the drug merely delays the death of the mice; in the second, frequent doses are requisite if the protection is to be other than temporary; and, in the third, a single dose given immediately after infection produces a maximal effect.

With regard to the rôle of the sulphonamide, evidence has been adduced that the drug has an inhibitory effect on the multiplication of small numbers of streptococci and various other organisms in vitro in broth medium and in deleucocyted blood. It is almost certain that this also occurs in the blood in vivo, but it is probable that here the leucocytes also play a part. Long and Bliss (1937) observed a marked degree of phagocytosis by the leucocytes in the peritoneal exudate of mice infected with hæmolytic streptococcus and treated with the sulphonamide; there was no evidence of phagocytosis in the untreated controls. These authors therefore believe that the drug has an important action in injuring the organisms and making them more susceptible to phagocytosis. In our experiments on *Bact. aertrycke* and *Bact. typhosum*, we obtained some support for this view; we could demonstrate a slight bactericidal effect for the sulphonamide in whole blood in vitro, but in deleucocyted blood or culture medium there did not appear to be a definite diminution in the rate of growth.

The drug is now being tried in the treatment of hæmolytic streptococcal and also in a few meningococcal infections in man, but the results of the mouse experiments would suggest that it might have an even wider application. In certain infections, the action is probably insufficient to be of clinical value by itself, and, in these, the sulphonamide might possibly be useful in conjunction with other measures—e.g., therapeutic serum in the treatment of pneumonia.

TABLE IV

Grades of Protection with p-*Aminobenzenesulphonamide*

—		Approx. number of fatal doses against which mice are protected.	
		For 2 days.	For 12 days.
A. Frequent doses give temporary protection only.	*Bact. aertrycke.*	10,000	1
	Friedländer's bacillus.	10,000	1
	Pneumococcus.	100	0
	Past. pseudotuberculosis.	100	0
	Past. septica.	100	0
B. Frequent doses give lasting protection. (Single dose gives temporary protection.)	*Streptococcus hæmolyticus.*	10,000	
C. Single dose gives lasting protection.	Meningococcus.	1,000,000	
	Bact. typhosum.	100–1000	
	Bact. paratyphosum B.	100–1000	

Summary

p-Aminobenzenesulphonamide protects mice against multiple lethal doses of *Bact. typhosum* and *Bact. paratyphosum* B. There is some degree of protection against *Bact. aertrycke*, Friedländer's bacillus, pneumococcus, *Past. pseudotuberculosis*, and *Past. septica*.

A single dose of the sulphonamide gives lasting protection against some of these organisms; repeated doses lead only to delay in the death-time of the mice infected with others.

In no instance are the results of treatment as satisfactory as in hæmolytic streptococcal and meningococcal infections.

(*References at foot of opposite page*)

THE EFFECT OF COMPRESSED-AIR BATHS UPON THE VITAL CAPACITY IN EMPHYSEMA

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THE compressed-air chamber, as used in the Brompton Hospital, was introduced into this country about fifty years ago, and was originally employed in the treatment of almost any chest disease. Soon its limited value was discovered and its range became narrowed. In 1894 Dr. Theodore Williams [1] reported on its use in chronic bronchitis with emphysema and in asthma. Of the former disease he had treated 33 cases, of which 26 improved; of the latter 15 cases, of which 12 improved. It was suggested in this paper that the results were due to "an increase in lung capacity" gained by the forcing open of alveoli previously out of use.

It is obvious that a patient suffering from difficulty in oxygenating his blood, due either to insufficiency of normal alveolar epithelium or to the limitation of respiratory movements, will benefit from an increase in the partial pressure of oxygen in the atmospheric air while this lasts. The normal partial pressure of oxygen is 20 per cent. of 760 mm. of mercury (i.e., 152 mm.), but in the compressed-air chamber, where the pressure rises to a maximum of one and two-thirds of atmospheric pressure, the partial pressure of oxygen will correspondingly rise to 5/3 of 152 (i.e., 257 mm. of mercury), and this may well explain the marked increase in comfort which an emphysematous patient experiences while actually in the bath. This effect is, however, essentially a temporary one, and lasting benefit can result only if the respiratory excursions are amplified, as the result of the increased pressure, or if some alveoli are brought into use which previously had been dormant by reason of spasm or occlusion.

In order to test whether the compressed-air bath does bring into use previously dormant alveoli, nine patients suffering from moderately severe emphysema were examined while undergoing this treatment, and vital capacity estimations were made before and after treatment (see Table). The initial vital-capacity reading in each case was considerably below the calculated normal reading. In addition each patient showed clinical and radiological evidence of generalised emphysema. The course of treatment under observation lasted about two months, and each patient attended twice weekly. At each treatment the pressure was increased gradually until it reached one and two-thirds atmospheres at the end of half an hour. This was maintained for one hour, and during the last half-hour the bath was gradually decompressed. In some of the cases under observation the respiratory rate was noticed to drop to nine or ten per minute.

VITAL CAPACITY READINGS BEFORE AND AFTER TREATMENT

Vital capacity readings were taken at every third treatment before, after, and once during the compressed-air bath, and are recorded in cubic centimetres. Patients received two compressed-air baths a week.

Case No.	First reading.		Second reading.		Third reading.		Fourth reading.		Fifth reading.		Sixth reading.		
	Before.	After.	Before.	After.	Before.	After.	Before.	After.	Before.	After.	Before.	During.	After.
1	2400	2350	2500	2450	2250	2500	2650	2600	2450	2500	2450	2300	2300
2	2050	1850	2000	1950	2200	2100	2050	2050	—	—	2200	2100	2150
3	1800	1850	1650	1700	1750	1750	1800	1800	—	—	—	—	—
4	2050	2000	2100	2150	2050	1750	1750	1750	1850	2000	—	—	—
5	1950	2000	2150	2150	1850	2050	2100	2100	2050	2100	2100	2100	2150
6	2600	2650	2500	2250	2350	2300	2800	2850	2800	2800	2900	3000	2520
7	2400	2400	2000	2600	1950	1750	2100	1700	1850	1900	2100	1950	1950
8	2250	2100	2300	2170	1950	1900	1550	1600	1750	1700	1500	2050	2000
9	1200	1200	1100	1200	800	1050	1100	1100	1450	1300	1400	1250	1200

Results.—Eight patients stated that while in the bath they experienced sensations described as "comfort," "looseness," or "freedom." Two patients considered that they were constantly less short of breath than they had been before the treatment was started (Nos. 1 and 6). One patient (No. 3) felt no improvement at any time. No definite temporary or lasting increase in the vital capacity was found. On the occasion when the estimations were also made while the patients were in the compressed-air bath, no definite rise in the vital capacity was obtained except in the case of No. 8 in whom the initial reading on that day was abnormally low.

Conclusions.—The estimation of the vital capacity of patients suffering from emphysema, carried out before and after compressed-air-bath treatment, does not support the view that any improvement in their condition is due to opening up of alveoli which previously were out of action.

[1] Aerotherapeutics, London, 1894.

(*Continued from previous page*)

DR. BUTTLE AND OTHERS: REFERENCES

Buttle, G. A. H., Gray, W. H., and Stephenson, D. (1936) *Lancet*, **1**, 1286.
Colebrook, L., Buttle, G. A. H., and O'Meara, R. A. Q. (1936) *Ibid*, **2**, 1323.
— and Kenny, M. (1936) *Ibid*, **1**, 1279.
Domagk, G. (1935) *Dtsch. med. Wschr.* **61**, 250.
Fleming, A. (1926) *Brit. J. exp. Path.* **7**, 281.
Levaditi, C., and Vaisman, A. (1935) *C.R. Soc. Biol. Paris*, **119**, 946.
Long, P. H., and Bliss, E. A. (1937) *J. Amer. med. Ass.* **108**, 32.
Miller, C. P. (1935) *Proc. Soc. exp. Biol., N.Y.* **32**, 1136.
— and Castles, R. (1936) *J. infect. Dis.* **58**, 263.
Nitti, F., Bovet, D., and Depierre, F. (1937) *C.R. Soc. Biol. Paris*, **124**, 16.
O'Meara, R. A. Q., and Brown, A. M. (1936) *J. Path. Bact.* **42**, 679.
Proom, H. (1937) *Lancet*, **1**, 16.
Rake, G. (1935) *Proc. Soc. exp. Biol., N.Y.* **32**, 1523.
Rosenthal, S. M. (1937) *Publ. Hlth Rep. Wash.* **52**, 48.
Tréfouël, J. and Mme., Nitti, F., and Bovet, D. (1935) *C.R. Soc. Biol. Paris*, **120**, 756.
Wright, H. D. (1933) *J. Path. Bact.* **37**, 257.

THE PHONOSTETHOGRAPH

A NEW METHOD OF RECORDING AND REPRODUCING SOUNDS HEARD ON AUSCULTATION

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THE problem of recording normal and abnormal heart sounds for the purpose of reference and study has for many years occupied the attention of physiologists and clinicians. Indeed, according to Hirschfelder, the first attempts were made by Donders as long ago as 1856. Most of this pioneer work was however chiefly connected with the photographic registration of the vibrations produced by the heart sounds conducted through the chest wall. In this field the brilliant work of Hürthle, Einthoven, Geluk, Holowinski and Lewis and others stand out.

With the evolution and rapid improvement of the thermionic valve and electrical amplifying systems came attempts by means of modern microphones to pick up the heart sounds through the chest wall and reproduce them through loud-speakers. The results obtained this way varied enormously in faithfulness, volume, and background noise. Such noise chiefly resulted from the hiss caused by the type of microphone used, amplified frictional noises caused by the microphone rubbing against the skin, and contraction of the intercostal muscles. The first worker to employ an electrical system of auscultation of the heart successfully was R. C. Cabot of Massachusetts in 1923. The details of this apparatus were published in 1924 by Gamble and Replogle.

During the past year or so I have been experimenting with a new electrical technique and an instrument I have designed for the purpose of auscultating the heart and chest, and recording phonographically the clinical sounds present in health and disease. This apparatus is called the phonostethograph. The experiments have proved very successful and the apparatus has been standardised. The record takes the form of a phonographic disc which may be replayed hundreds of times. These records may be interpolated where necessary with speech explanations of the cases under observation, and at the time of recording. The time taken to make a record varied from five to fifteen minutes, and it can be replayed within thirty seconds. In all about 200 cases have been recorded, including normal average subjects, athletes, cases of mitral stenosis, aortic stenosis, and congenital heart disease. In these records the normal and abnormal sounds may be reproduced loudly and clearly or in the attenuated form as heard with the stethoscope. In cases where the rhythm of the heart is too fast for easy timing of murmurs, it is possible to produce slow motion records for detailed analysis. The normal cases were recorded before and after exertion, and it was interesting to note the delicate changes in sound frequencies which occur in the heart sounds of individual subjects after exertion, changes which were undetectable with the stethoscope. The fœtal heart at 36 weeks has also been recorded.

A great deal of time could be saved in teaching students to recognise various clinical abnormal sounds that occur in cardiac disease by giving them the opportunity of studying at leisure the characteristics of these cases that it is now possible to record faithfully in an amplified form. In this manner after being accustomed to hear the abnormal sounds loudly and clearly reproduced they will develop greater skill in the detection of these sounds, and when confronted with the living patient they will know what to listen for, and will be able more easily to detect any variations from the normal that may be present. In support of this argument I cannot do better than quote the remarks of Cabot (1923) referring to the great advantages of electrical amplification of heart and breath sounds for the purpose of clinical teaching and investigation:—

"The advantages of such an apparatus for teaching purposes are very great. Chief amongst these is the simultaneous hearing of the identical sound by the instructor and students. Immediate comment is possible, followed by the student's immediate attention to the feature commented on. Another advantage is the economy of time and strength for both patient and teacher."

Cabot was then referring to his electrical stethoscope introduced in 1923 and used with great success in his clinic.

THE INSTRUMENT AND ITS USE

The greatest problem which presented itself in the working out of a suitable technique that would ensure the production of good recordings was that of exclusion of interference by extraneous noise. A microphone chest-piece had to be devised which would give maximum sensitivity combined with a minimum of background hiss. After experimenting

The apparatus: A = Speech microphone. B = Loud-speaker. C = A finished record. D = Recording section. E = Chest-piece fixed to patient. F = Amplifier, with frequency filters above.

with several types of microphone it was decided to use a microphone of the carbon granule type. I devised one that embodied the necessary characteristics of lightness, sensitivity, and minimum hiss. It was also found impracticable for the investigator to hold the microphone in position manually, as the friction of his fingers against the microphone casing caused a great deal of noise which interfered with the clarity and quality of the recordings.

The phonostethograph consists of a high-gain amplifier with four stages of amplification, and fitted with frequency filters which enables the investigator to eliminate at will any group of sound frequencies that might interfere with the clinical sounds under observation. The recording section embodies a system of high-fidelity direct recording especially constructed for this work by the Marguerite Sound System Company. A moving-coil mains-energised loud-speaker and a pair of earphones are also incorporated in the circuit.

The technique employed is as follows:—

The investigator finds the region over the heart or lung where the clinical sounds are best heard with a stethoscope. Having found the spot it is marked with a skin pencil. The chest-piece is then applied over the area by means of an elastic belt. The necessary adjustments are made to the amplifier controls and the investigator listens in with the earphones. When he has obtained the optimum degree of volume of the sounds under observation, the loud-speaker is then brought into operation, and the heart or breath sounds become audible loudly and clearly to all present. Should it then be desired to make a permanent record of the case in question, he sets the recording unit in operation and the record is made in a few minutes. By means of the speech microphone he makes his personal observations on the case, all of which are recorded permanently. During the entire procedure the patient lies on a couch which is screened off from the apparatus.

The records produced by the phonostethograph are "master" discs and not ordinary gramophone records, and should only be reproduced by means of a high-class reproducing unit. This is an important point, since in order to study heart sounds in detail it is necessary to be able to hear as perfectly as possible the full range of sound frequencies generated by the heart's contraction and recorded on the master disc. Should a reproducing apparatus of inferior efficiency be used, owing to inefficiency of the mechanism only a poor representation of the frequency range will be rendered audible.

Compared with other methods of registering heart sounds the phonostethograph offers the great advantage of allowing the patient to breathe during the actual recording process without the record being masked by interfering breath sounds. This is made possible by the use of special frequency attenuators by which these sounds can be cut out of the sound picture before it is recorded.

ADVANTAGES

The phonostethograph should prove useful for teaching and for demonstrating typical cases of cardiac and pulmonary disease at clinical demonstrations and lectures with the minimum of fatigue to patients by avoiding several individual examinations. It would also be useful in keeping records of cardiac cases for reference and study; and for following up the improvement or retrogression of these cases by comparing records taken at various times and under various conditions of treatment, &c. By the use of this technique the physician has no need to rely on his memory of the sound picture or the attempts at graphic description of sounds that only too often defy adequate description.

I should like to take this opportunity of thanking Mr. E. M. E. Decottignies for his kind assistance and coöperation in the foregoing experiments.

The apparatus and its recordings were demonstrated at a meeting of the Physiological Society held at Guy's Hospital on Dec. 12th. The experiments were carried out in a laboratory kindly placed at my disposal by the authorities of King's College Hospital medical school.

REFERENCES

Cabot, R. C. (1923) *J. Amer. med. Ass.* **81**, 298.
Gamble, C. J., and Replogle, D. E. (1924) *Ibid.*, **82**, 387.
Hirschfelder, A. D. (1918) Diseases of the Heart and Aorta. London.
Jacobsohn, L. (1923) *J. Amer. med. Ass.* **80**, 493.

ENCEPHALITIS IN MEASLES

REPORT OF FIVE CASES WITH ONE DEATH AND ONE RECOVERY AFTER CONVALESCENT MEASLES-ENCEPHALITIS SERUM

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More than 200 cases of encephalitis in measles have been reported. The number recorded has been greater in recent years, probably because of the increasing recognition of this complication. In 1928 Ford gave an excellent summary of the cases recorded up to that time, and produced a clinical classification of the types. A similar résumé has been made recently by Guibert (1936).

The complication occurs at all ages and apparently bears no relationship to the severity of the attack of measles. The time of onset is variable, but the end of the eruptive period, between the 3rd and 7th day of the rash, is the commonest. Clinically, the striking feature of the condition is its polymorphism, but for practical purposes two main types may be distinguished. In the first there is evidence of a more or less profound and diffuse involvement of the nervous system—a meningo-encephalomyelitis. The various parts of the nervous system are, however, affected in different degrees. As the condition evolves there is a tendency for the diffuse features to be replaced by localisation in one or more parts of the nervous system. This predominant localisation permits of the classification of the disease into its various clinical types: the meningitic, the encephalitic, the myelitic, the multiple cerebral-focal, the mental, the hemiplegic and aphasic, the paraplegic, the cerebellar or ataxic, &c. The initial general symptoms vary from a mild degree of apathy or irritability to a profound stupor or delirium. Convulsions are common and may be severe; and general muscular rigidity is frequent. A great variety of nervous symptoms is revealed with returning consciousness. In the other main group the initial diffuse symptoms are absent. The localised lesions may exist from the onset and may simulate a single focal lesion.

The *cerebro-spinal fluid* almost always shows some abnormality. Generally the fluid is clear with some increase in pressure. The slight or moderate increase in cells is due mainly to mononuclears. The protein

content is also slightly or moderately increased. If there is not a parallel rise in protein and cells the tendency is for the protein to be increased and the cells normal. The sugar content is uniformly normal or high, and the chlorides are normal or slightly diminished. Bacteriological examination always gives a negative result. Wide variations from these usual findings are, however, common in the recorded cases.

On the *ætiology* of the condition two views are held. The commoner regards it as a specific encephalitis of measles; the other does not. The most frequent histopathological finding is a perivascular myelin destruction suggesting a toxic rather than an inflammatory process. The fatality-rate is variously given as 10–25 per cent. If the early dangerous period is passed the prognosis as to life is good, but permanent sequelæ are not uncommon.

In *treatment* glucose, hexamine, sodium salicylate (intravenously and orally), and magnesium sulphate (orally, per rectum, intravenously, and intramuscularly) have been employed. Convalescent measles serum has been used as a therapeutic measure. Lowenburg and Schaller (1926) administered it intrathecally, intravenously, and intramuscularly, producing rapid improvement in the cerebro-spinal fluid but with apparently little effect upon the clinical course. Dufourt and Reure (1932) and Peterman and Fox (1933) also employed it but were not impressed with its value.

ILLUSTRATIVE CASES

The five cases here recorded occurred during the measles epidemic in the first seven months of 1936. The points which appear of particular interest in this series are the frequency of meningeal signs and the diagnostic importance of involvement of the sphincter of the bladder. One death occurred, and the post-mortem findings are recorded. One case ran a course closely simulating epidemic encephalitis except that the stages of the disease evolved more rapidly. This case was successfully treated by serum from a patient recovered from measles encephalitis. No previous record of the employment of this particular type of serum can be traced in the literature.

CASE 1.—A very mild case of encephalitis in which the only symptom was retention of urine.

A male aged 1 yr. 7 mths.

History.—In-patient of a general hospital since Jan. 30th, 1936, for broncho-pneumonia. Feb. 19th: coryza, conjunctivitis. Feb. 20th: rash, first appearing on face.

On admission (Feb. 20th).—Temperature 97° F., pulse-rate 132, respirations 40; severe attack of measles with gastro-enteritis and broncho-pneumonia.

Progress.—Gradual recovery from measles, broncho-pneumonia, and enteritis, but developed otitis media on Feb. 25th. On March 2nd all symptoms had subsided except that the stools were still loose. Retention of urine with overflow; no abnormality in the urine. Regular catheterisation began. March 3rd: seen by consulting surgeon who was unable to detect any surgical cause for the retention. March 4th: general condition good. Knee-jerks: left present, right feeble. Abdominal reflexes not elicited; pupillary reflexes sluggish; no meningeal signs. March 6th: radiogram of urinary tract negative. Albuminuria; onset of cystitis. March 30th: began passing urine normally; cystitis rapidly improved. April 22nd: sent to convalescent hospital.

The diagnosis of encephalitis was made in retrospect after the significance of retention of urine had been appreciated.

CASE 2.—A mild case in which the prominent features were meningeal signs and muscular weakness.

A male aged 5 yrs. 6 mths.

History.—April 8th, 1936: cough, vomiting, nasal discharge, rash. April 14th: backache, pains in limbs and abdomen, shivering. Retention of urine, constipation, weakness of legs.

On admission (April 15th).—Temperature 98·2° F., pulse-rate 100, respirations 24. Thin, not very ill, general lassitude; fading morbilliform rash; slight bronchitis. Cranial nerves normal; slight neck rigidity; no head retraction; slight positive Kernig on left; tendon reflexes not elicited except arm-jerks; plantar responses flexor; right upper abdominal reflex present, others absent; general muscular weakness.

Progress.—April 16th: lumbar puncture:

Fluid clear under pressure.	Protein: 55 mg. per 100 c.cm.
Cells: 6 per c.mm.	Globulin: slight increase.
Chlorides: 770 mg. per 100 c.cm.	Culture: sterile.

April 17th: passed urine normally when sitting up, but unable to do so lying down. Muscular weakness persists, particularly in muscles of back and legs, so that he could not walk or stand without support. Neck rigidity passed off. April 20th: seen in consultation with Dr. Macdonald Critchley who confirmed the diagnosis. After this muscular power began to return and by April 27th he was able to walk by himself. May 1st: discharged mentally normal; muscular power apparently normal; walking well; tendon reflexes present, but knee- and ankle-jerks sluggish. No other abnormality in the central nervous system.

CASE 3.—A severe case that succumbed. Prominent features were the state of unconsciousness and the presence of meningeal and bladder signs.

A female aged 3 yrs.

History.—May 8th, 1936: coryza and cough. May 9th: rash, which first appeared on the forehead. May 10th: drowsy; crying out; retention of urine. May 12th: much more drowsy; "sleeping" almost continuously; twitching of both arms, grinding of teeth, and rolling of the head. May 13th: passed urine for the first time since May 10th.

On admission (May 13th).—Temperature 99·4° F., pulse-rate 88, respirations 40. Measles staining of the skin. Semi-conscious; slight head retraction and neck rigidity; bilateral positive Kernig sign; tendon-jerks elicited but feeble; pupils failed to react to light; abdominal reflexes absent; plantar reflexes extensor; retention of urine with overflow.

Lumbar puncture: clear fluid under pressure. Report (Dr. W. Mair):

Clear fluid.	Chlorides: 740 mg. per 100 c.cm.
Cells: 20 per c.mm. (mononuclears).	Protein: 90 mg. per 100 c.cm.
	Globulin: increased.

A *Staphylococcus albus* (contamination) was obtained from the first lumbar puncture; the second was sterile.

Progress.—May 14th: unconscious; tendon-jerks absent; frequent twitchings of right arm and left side of face. Continued in this state until death supervened on May 15th.

Post-mortem examination.—We are indebted to Dr. A. B. Bratton for the following summary of the necropsy carried out by him:—

Microscopic foci of collapse in congested lungs. Cloudy swelling of myocardium, liver, and kidneys. Slight excess of leucocytes in œdematous spleen. Nodule of ectopic cortex in capsule of suprarenal body. Congestion of pancreas. Dilatation and congestion of urinary bladder. No abnormality in stomach, intestines, uterus, or ovaries. Middle ears clean.

To the naked eye the brain, spinal cord, and their meninges appeared congested. Sections were taken from various parts of the cerebral cortex and white matter and from the basal ganglia, mid-brain, pons, medulla and cervical, thoracic and lumbar cord. In all sections some degree of demyelination is present; for the most part this is inconspicuous, consisting of a few very narrow perivascular zones, rather more frequent in the white matter than in the grey; there is also a narrow subependymal zone over the left optic thalamus. In the sixth thoracic segment however there is an area (0·1 by 0·05 cm.) involving the central parts of both posterior columns astride the median raphe.

In all sections perivascular "cuffing" is also seen. The infiltration consists of lymphocytes, plasmacytoid cells, histiocytes, and rarely a few neutrophil leucocytes,

and is usually sparse, there being only a single row of cells, often incomplete, but in the basal ganglia, midbrain, pons and medulla there are occasionally as many as four rows. Fat phagocytes also occur in the infiltration, especially where there is a zone of demyelination around the affected vessel, and a few are present in other demyelinated areas. There are also a few small hæmorrhages associated with the "cuffing." The "cuffed" vessels are few and are situated more often in the white matter than in the grey, but there appears to be no constant relation between the demyelination and "cuffing": any one vessel may show both changes together or either separately.

A demyelinating encephalitis is present in which the demyelination is less conspicuous and perivascular infiltration more conspicuous than usually described.

CASE 4.—A mild case, the prominent features of which were involuntary movements of the head and grimacing.

A female aged 1 yr. 4 mths.

History.—June 11th, 1936: cough, coryza, discharging eyes. June 12th: rash, which first appeared on face.

On admission (June 12th).—Temperature 99° F., pulse-rate 104, respirations 24. Typical attack of measles of moderate severity.

Progress.—June 17th: symptoms of measles largely subsided. Child irritable. June 30th: temperature 105° F.; attack of enteritis. July 2nd: involuntary movements of face and head; grimacing; smiling at apparently nothing in particular, as she appeared unaware of her environment; twitching of left side of face; head nodding and other "purposeless" movements. No evidence of tetany; no meningeal signs. Examination of central nervous system negative except that right knee-jerk was not elicited and left knee-jerk was feeble. Still irritable. July 4th: parents visited the patient and thought she had a blank look and did not recognise them. Movements continued rather intermittently. Abdominal reflexes and tendon-jerks not elicited. Plantar responses doubtful. July 5th: little more irritable. Doubtful rigidity of neck. July 10th: improving; still grimacing but not so frequently. Tendon reflexes still absent but abdominals now brisk and equal. No meningeal signs. Indefinite weakness of left leg. Thereafter improvement continued slowly, and after July 31st no movements were seen. August 14th: apparently mentally normal; says "mummie" and "daddy." Stands by herself and walks around cot. All tendon reflexes present but ankle-jerks feeble; abdominal reflexes present and equal. General condition good. August 20th: discharged.

CASE 5.—A severe case successfully treated with convalescent measles-encephalitis serum. The striking feature was the resemblance of the disease to epidemic encephalitis.

A female aged 4 yrs. 6 mths.

History.—July 5th, 1936: cough. July 6th: rhinorrhœa; rash, which first appeared on the face. July 9th: vomiting.

On admission (July 10th).—Temperature 101·8° F., pulse-rate 152, respirations 56. Quite ill; feverish and restless; breathing distressed; marked coryza; râles scattered over lungs; general morbilliform rash; Koplik spots in profusion.

Progress.—July 11th: vacant look; slight internal squint; incontinence of urine; obstinate constipation; temperature subsiding. July 12th: indefinite rigidity of neck; no retraction; Kernig sign not elicited; deep jerks, eye reflexes, and superficial reflexes present. Screaming attacks, particularly when disturbed; does not talk; refuses food; nasal feeding begun. July 15th: definite signs in the nervous system: neck rigidity; positive Kernig; left knee-jerk and both ankle-jerks absent; abdominal reflexes absent; plantar reflexes doubtfully extensor; pupils equal, react to light and accommodation; vacant expression; doubtful weakness of the right side of face; doubly incontinent; temperature rising.

Lumbar puncture showed clear fluid under moderate pressure. Report (Dr. W. Mair):

Appearance: clear	Cultures: sterile.
Cells: less than 3 per c.cm.	Wassermann and Kahn: negative.
Chlorides: 740 mg. per 100 c.cm.	Colloidal gold: 2221000000.
Protein: 40 mg. per 100 c.cm.	
Globulin: slight increase.	

July 17th: much more lethargic; almost unconscious. All deep jerks and abdominal reflexes absent. Temperature 100° F.; general condition much worse; prognosis considered almost hopeless.

Serum treatment.—At this stage Dr. W. Gunn suggested the administration of serum from a patient convalescent from measles encephalitis; 20 c.cm. were given intravenously and produced immediate benefit. The downward progress was arrested and within 24 hours there was evidence of definite improvement. Consciousness returned sufficiently to allow the patient to answer simple questions; the temperature began to subside; she started taking fluids by mouth; and the neurological signs improved. July 19th: neck rigidity less pronounced; Kernig sign almost disappeared; abdominal reflexes present; left knee-jerk present; drowsiness largely gone. Thereafter her condition steadily improved and on July 22nd no abnormality could be detected in the central nervous system. She was talking and feeding herself. July 23rd: a considerable change appeared in her demeanour. She was "naughty," screaming at the top of her voice, constantly trying to get out of bed, and tending to be vicious and destructive. After one meal she threw her plate across the ward. A fine tremor of the parkinsonian type appeared. This changed manner persisted for a week during which time she slept badly and required hypnotics. She then improved fairly rapidly and by August 2nd was apparently normal, tremor having disappeared. She was discharged on August 22nd mentally normal, well behaved, with normal speech, regular action of the bowels, and no abnormality of the central nervous system.

DISCUSSION

Of the cases in this series all showed involvement of the sphincter of the bladder. Definite meningeal signs were present in all except Cases 1 and 4. In Cases 3, 4, and 5 mental symptoms or interference with consciousness occurred, associated with involuntary muscular movements. Case 5 was striking in its resemblance to epidemic encephalitis; and its rapid response to convalescent measles-encephalitis serum was most encouraging.

REFERENCES

Dufourt, A., and Reure, J. (1932) *Lyon méd.* **149**, 235.
Ford, F. R. (1928) *Bull. Johns Hopk. Hosp.* **43**, 140.
Guibert, L. E. M. (1936) *Rev. Serv. San. mil.* **104**, 477.
Lowenburg, H., and Schaller, A. L. (1926) *Arch. Pediat.* **43**, 73.
Peterman, M. G., and Fox, M. J. (1933) *Amer. J. Dis. Child.* **46**, 512.

TUMOUR GROWTH IN HYPOPHYSEAL DWARFISM

BY Prof. BERNHARD ZONDEK, M.D.

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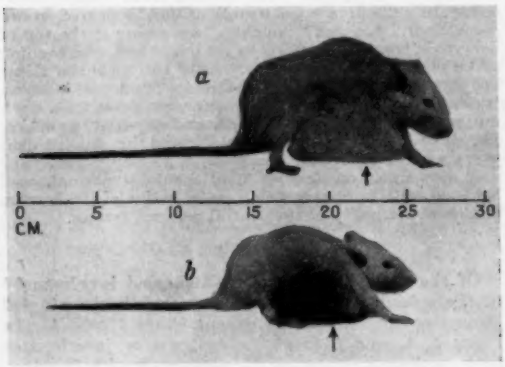
As reported in previous papers (Zondek 1936) it is possible to produce dwarfism experimentally in rats by the prolonged administration of follicular hormone, which prevents the growth hormone elaborated in the anterior pituitary from entering the blood stream. The absence of the growth hormone is shown by the fact that the rats will grow more slowly and cease growth earlier than normally. While the control animals are 16·5 cm. long and weigh 170 g. on an average, the dwarfs reach a length of only 14·4 cm. and a weight of 90–100 g. The slackening of growth is proportionate, affecting equally all parts of the body—the head, the bones, the tail, and the internal organs. That the dwarfing is hypophyseal in origin may be deduced from the finding that Evans's pituitary growth hormone will stimulate the dwarf animals to grow again.

TUMOURS IN DWARF RATS

It seemed interesting to investigate the development of malignant tumours in dwarf animals, since it has been suggested that this is influenced by the anterior pituitary. Ball and Samuels (1932) observed a less pronounced growth of transplanted mammary carcinoma in hypophysectomised albino rats. Reiss, Druckrey, and Hochwald (1933) have stated that if a rat weighing 60–120 g. is inoculated with Jensen sarcoma two or three weeks after hypophysectomy, the tumour will grow to the size of a pea, or at most to that of a cherry, and will then undergo complete involution. The greater the time since hypophysectomy, the shorter will be the duration of life for the tumour. This effect is missed even if the slightest



Eunuchoid dwarf rat (*b*) in which dwarfing was produced by 300,000 M.U. of dimenformon given from the age of one month, and control rat (*a*). Both were males, aged 6 months, and are shown five weeks after the implantation of a benzpyrene sarcoma.

remnant of anterior pituitary tissue is left during the extirpation, which shows that it is the anterior lobe that inhibits the growth of the tumour. This is also proved by the fact that the growth-inhibition is counteracted by giving Evans's growth hormone.

If, therefore, the growth of malignant tumours depends upon the growth hormone of the anterior pituitary, one would expect that malignant tumours would not grow—or at least would grow much more slowly—in our hypophyseal dwarf rats than in the controls. For the experimental tumour I used the benzpyrene sarcoma described by Kennaway and Cook et al. (1935). I did not use, however, the primary tumours obtained by prolonged subcutaneous injection of benzpyrene, but those that had already gone through several passages on transplantation; all these tumours "took."[1]

For the first experiments a tumour material was used that had gone through six passages. Pieces of the tumour, the size of a small pea, were implanted into the left axilla of the rat. As experimental animals we chose male rats that had each received twice a week 5000 M.U. (mouse units) of Dimenformon,[2] diluted in 0·2 c.cm. of oil, for at least five months. They were typical dwarf males, 14·4 cm. long and weighing 100 g. The control animals were each injected over the same period twice a week with 0·2 c.cm. of olive oil. They were 16·5 cm. long and weighed 170 g. After the tumour implantation the dwarf rats were further treated with dimenformon, the control animals still receiving olive oil.

A tumour the size of a bean was palpable ten days after the implantation in both the control and the experimental animals. The tumours grew rapidly, and three weeks after implantation they had already reached the size of a pigeon's egg. At five weeks the tumours were enormous compared with the size of the rat, being about as big as a hen's egg. The important fact is that the growth of the tumour was *just as rapid in the dwarf animals* as in the controls (see Figure).

Eight months later I carried out the same experiments in female animals, this time using a tumour material that had gone through twenty passages. Here again the tumour "took" in every animal. The result was the same as in the first series. The tumours grew extraordinarily rapidly and there was no difference between the controls and the dwarfs.

These experiments prove that the growth of the tumour in hypophyseal dwarf animals is the same as in normal animals. Although in the dwarf rats the growth hormone is out of action, and the growth of the body and of internal organs is accordingly inhibited, its absence does not seem to affect the development of implanted malignant tumours.

There is, however, a characteristic difference between a hypophysectomised animal and our experimental animal. In the former, besides the growth hormone, all the hormones elaborated in the anterior lobe are absent. In my experimental animals the growth hormone is probably being produced in the anterior lobe, but its secretion into the blood stream is being prevented. In my animals I block certain hormones, and among them the growth hormone. Perhaps the hypophysectomised animal differs in its behaviour towards the tumour growth from one in which the pituitary is merely blocked by follicular hormone; and possibly my results, so contrary to those hitherto reported, may be explained by this difference. This, however, does not seem to me to be very probable. If, indeed, the growth hormone is one, or the only, stimulating factor in the growth of malignant tumours, one would expect that in our dwarf animals the malignant tumours would not grow at all, or would at least grow much more slowly than in the controls. Since, however, the development of the tumours in our dwarf animals has not been inhibited at all, I do not believe that the anterior pituitary regulates the growth of malignant tumours.

SUMMARY

1. Prolonged treatment with follicular hormone impairs the function of the growth hormone of the anterior pituitary, and hence results in hypophyseal dwarfism. The release of the growth hormone into the blood stream is inhibited by follicular hormone, and this reduces the growth of the whole body, including the internal organs.

2. When malignant tumours are implanted into hypophyseal dwarf rats—I used a sarcoma caused by benzpyrene which had gone through several passages—the tumours grow as fast in the dwarfs as in the control animals. The absence of growth hormone in the dwarf rats consequently does not impede the growth of malignant tumours.

3. From this it follows that the growth hormone of the anterior pituitary has no important effect upon the growth of malignant tumours.

REFERENCES

Ball, H. A., and Samuels, L. T. (1932) *Amer. J. Cancer*, **16**, 351.
Kennaway, E. L., and Cook, J. W., et al. (1935) *Proc. Roy Soc. B.* **117**, 318.
Reiss, M., Druckrey, H., and Hochwald, A. (1933) *Z. ges. exp. Med.* **90**, 408.
Zondek, B. (1936) *Lancet*, **1**, 10, 776; **2**, 842.

[1] For the supply of the tumour material I am indebted to Prof. L. Halberstaedter of the cancer research institute in the Hebrew University, Jerusalem.

[2] I am indebted to Dr. Marion Tausk of Messrs. Organon (Oss, Holland) for supplying dimenformon.

SOLITARY METASTASIS IN SPLEEN IN CARCINOMA SIMPLEX OF RIGHT BREAST

WITH EXTENSIVE LOCAL SPREAD

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ALTHOUGH metastatic carcinoma of the spleen is by no means rare, it is unusual to find it in the absence of deposits in other abdominal viscera. The following case, where the primary growth was in the right breast, is recorded because apart from local spread the only visceral metastasis was in the spleen.

CASE REPORT

A female, aged 66, was admitted to Napsbury Hospital on Sept. 24th, 1926, under certificate, with the diagnosis of involutional melancholia. She was depressed, agitated, and distressed, refusing food and insisting that her bowels were blocked and would never act again. The illness was gradual in onset, without discoverable cause, and there had been no previous symptoms of mental disorder. Physically, she was ill nourished but no evidence of organic disease could be found. Twenty years previously she had had an operation performed for a "fibroid" uterus. She had one son aged 37.

During her stay in hospital she showed no change in her condition until March 19th, 1936, when, at the age of 76, it was noticed that she had "swollen glands" on the right side of the neck. A few days later the left cervical lymph nodes were enlarged and the voice became husky. Further examination revealed enlarged lymph nodes in the right supraclavicular region and axilla. The right breast was fuller than the left and it contained a diffuse mass, firm in consistency but not hard. There was no anæmia. On April 13th she complained of pain and tenderness over the right clavicle and of swelling of the right arm. There were dilated veins over the clavicle and massive œdema of the arm with a temperature of 101° F. Two days later she died.

Autopsy.—The body was that of an ill-nourished elderly female of sparse build with massive œdema of the right arm. Noticeable fullness of right breast, the areola appearing to be pushed forward while the nipple was a little retracted. Deposits of growth were visible in lines, which could be felt as cord-like structures, radiating from the breast in all directions and particularly towards the clavicle. On section, the tumour was softer than the usual carcinoma and slightly pink in colour with a few punctate hæmorrhages. It was adherent to the underlying muscle. The cervical lymph nodes were greatly swollen and contained a softish pink growth undergoing necrosis in the centre. The thyroid was enlarged and contained a deposit of growth on the right side and a smaller one on the left. The larynx and trachea were not compressed. The lungs, pleuræ, and bronchial lymph nodes were carefully searched for secondary tumours but no naked-eye deposits were found. The heart was small and flabby, and the great vessels showed only a little atheroma. Examination of the abdominal cavity revealed one large metastasis in the spleen, lying deep in the parenchyma towards the capsule and opposite the hilum. There was a distinct bulge and stretching of the capsule of the spleen corresponding to the underlying tumour, but at no point did they meet, being separated always by a strip of splenic parenchyma. The spleen weighed 205 grammes: when cut longitudinally the tumour was found to be roughly spherical in shape with a diameter varying from 38 to 42 mm. (see Figure). The gall-bladder contained a few small stones. The uterus was small and atrophic. The ovaries could not be identified (they were probably removed at operation). The peritoneum, liver, pancreas, kidneys, suprarenals, abdominal lymph nodes, mesentery, stomach, and intestines were carefully searched but no other metastasis could be found. The brain weighed 1120 grammes. No secondary tumours could be found. The spinal cord and skeleton were not examined for metastases.

Histological appearances.—Examination of the growth in the breast revealed a highly cellular and undifferentiated type of tumour, the cells having scanty cytoplasm and varying considerably in size and shape with frequent mitotic figures. The arrangement of the cells was so irregular that there was not even a suggestion of alveolar formation. There were numerous thin-walled vascular channels, in the lumen of some of which could be seen tumour cells, together with red corpuscles, but there was little in the way of stroma. Parts of the growth were seen invading the adjacent glandular and adipose tissues, permeating between the cells of the latter and carrying with them thin-walled vessels and scanty stroma. Some chronic inflammatory reaction could be seen in outlying parts.

The splenic metastasis.

The appearance of the growth in the spleen was similar to that of the one in the breast, except that there was closer packing of the malignant cells. The advancing edge showed definite infiltration although in at least one part there was an appearance of "pseudo-capsule" formation. In one place there was a colony of malignant cells at some distance from the advancing edge. Examination of parts of the spleen well removed from the tumour did not reveal any evidence of diffuse involvement with malignant cells. The spleen was of the senile type, comparatively acellular, with thickened trabeculæ and extensive hyaline change in the walls of the vessels.

The histological appearances were considered to be those of a carcinoma simplex.

COMMENTARY

Carcinoma was, until recently, thought to metastasise to the spleen only very rarely. Recent statistical inquiries, however, have shown that this is not the case and that splenic deposits are not infrequent. Warren Shields and Davis (1934) for instance, in a series of 1140 consecutive cases of carcinoma of all types, found naked-eye metastases in the spleen in 1·9 per cent.: they occurred most frequently when the primary growth was in the lung (23 per cent. of 13 cases) or in the breast (15 per cent. of 193 cases). The variety of carcinoma which they found most frequently metastasised to the spleen was the rapidly growing and undifferentiated carcinoma simplex (of 162 cases of carcinoma simplex 20 had metastases in the spleen, 18 of which had their origin in the breast). The growth presumably reaches the spleen by way of the blood stream because lymphatic vessels are said not to penetrate the parenchyma and they are infrequent in the capsule.

It is, therefore, the relatively uncommon and undifferentiated varieties of carcinoma that may be expected to be found in distant organs and this is borne out by facts. In this connexion, it is interesting to note that Krumbhaar (1926) found metastatic sarcoma to form a high proportion of spleen tumours. In that they are soft rapidly growing tumours with a capacity for penetrating into the systemic and pulmonary circulations, sarcoma and carcinoma simplex may be considered very similar in their behaviour. The more common type of carcinoma, for example the scirrhous, spreads by means of lymphatics and only rarely does it invade the blood stream and give rise to distant metastases (Sampson Handley). This then is one reason why secondary carcinoma of the spleen is uncommon.

Another factor appears to be the mobility of the spleen. Kettle (1912) has suggested that, for this reason, tumour colonies are prevented from growing in the spleen, for it shares with other mobile structures —heart, striated muscle, and bowel—the distinction of being most rarely affected. The age of this patient was 76. Possibly the interstitial changes which occur in senile spleens and consequent diminution of mobility account for the greater incidence of metastatic tumour in elderly as against younger persons.

Warren Shields and Davis, however, noted that in every case where the spleen was involved there were also metastases in three or more organs. In none was the spleen or spleen and lymphatic nodes affected alone. The case described, therefore, is unusual in that the splenic tumour is the only abdominal metastasis and the only one which cannot be readily explained on the basis of a lymphatic spread.

The presence of this large growth in the spleen is further evidence against the view now partly discredited, but still upheld in part by Krumbhaar in 1927, that the spleen exerts a "specific antagonistic action" against carcinoma cells a view in favour of which there has been some experimental work.

SUMMARY AND CONCLUSIONS

1. A case is described of carcinoma simplex of the right breast with a large secondary deposit in the spleen. No other abdominal metastases were found.

2. In order for a carcinoma mammæ to metastasise to the spleen, a blood-stream invasion is necessary. This is most likely to occur with a carcinoma simplex.

3. Granted a blood-stream invasion, a splenic metastasis is most likely to grow when that organ is relatively immobile, as in the spleen of advancing years.

4. The presence of a large metastasis in the spleen and none elsewhere in the abdominal cavity is further evidence against the now partly discredited view of a "specific antagonistic action" towards carcinoma cells on the part of the spleen.

I wish to thank Dr. A. O'Neill, medical superintendent of Napsbury Hospital, for permission to publish this case.

REFERENCES

Kettle, E. H. (1912) *J. Path. Bact.* **17**, 40.
Krumbhaar, E. B. (1926) *Ann. clin. Med.* **5**, 833.
Shields, W., and Davis, A. H. (1934) *Amer. J. Cancer*, **21**, 517.

MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTION OF THERAPEUTICS AND PHARMACOLOGY

AT a meeting of this section held on Nov. 9th, Dr. D. C. HARE, the president, in the chair, a joint contribution by Prof. E. C. DODDS and Dr. R. L. NOBLE on the relation between the

Pituitary and Gastric Secretion

was communicated by Dr. Noble. He described the severe hæmorrhagic lesions produced in the stomach of some animals after injection of posterior pituitary extract. In the rabbit they could be produced unfailingly, and the typical appearances were seen in the upper area of the stomach, corresponding to the distribution of the oxyntic cells. If the stomach contents were neutralised before the injection was given the effects did not occur. In their experiments Prof. Dodds and Dr. Noble had collected specimens of gastric juice from cats and rabbits through gastric fistulæ which had usually been established before and allowed to heal completely. The injection of the extract of the posterior lobe of the pituitary was found to inhibit the secretion of gastric juice induced by various stimuli. The most powerful stimulus to gastric secretion was that produced by injection of histamine, one milligramme producing in a rabbit a profuse flow after half an hour lasting about three hours. The injection of posterior pituitary extract B.P. 15 minutes before histamine completely inhibited the secretion for even six or more hours. The excretion of neutral red was similarly inhibited; if given with histamine it was usually excreted with the gastric juice after half an hour. The secretions produced by sham feeding and pilocarpine were also inhibited by pituitary injection. Control extracts of tissues other than the posterior pituitary did not affect the secretion, and the inhibition was only produced by the vasopressive principle and not by the oxytocic principle of the posterior lobe extracts. In cats the response was the same whether the animal was unanæsthetised or under Nembutal. In searching for a more physiological stimulus than histamine the effect of insulin on gastric secretion had been observed. A subcutaneous injection of two units in a cat caused a definite secretion which was not so profuse and was of shorter duration than that found after histamine. The acid values were slightly lower. Insulin, however, increased all components of the juice, and in contrast to histamine caused a marked increase in peptic activity. All anæsthetics abolished that action of the insulin. The response appeared to be initiated but not maintained by the hypoglycæmia; the fact that the gastric stimulation by insulin was abolished by section of the vagi or decerebration showed that the mechanism involved was nervous. If the animal were given a previous injection of pituitary extract and then tested with insulin no secretory response occurred, and control tests showed that this inhibition was not due to the antagonistic action of insulin and pituitary extracts on the blood-sugar.

From these results Prof. Dodds and Dr. Noble had concluded that a substance contained in the vasopressive fraction of posterior pituitary extracts abolished all types of gastric secretion which might occur in a normal animal. The action was found to affect the volume of gastric juice and not primarily the acidity, but intravenous injections might prevent the formation of any gastric juice and a temporary condition of achlorhydria might ensue.

Prof. Dodds was anxious to know whether any

other agent had been found to inhibit the secretion of gastric juice completely.

Dr. LUCY WILLS wondered whether the effect obtained by pituitary was related to the reduced acidity found in hyperthyroidism, and asked if any effects had been produced by giving thyroid extract.—Prof. DODDS answered that he had obtained none in his experiments.

Dr. R. D. LAWRENCE asked whether the stimulation of secretion could be obtained with insulin apart from hypoglycæmia.—Dr. NOBLE said it had only occurred with hypoglycæmia.

Liver and Yeast in Macrocytic Anæmias

Dr. LUCY WILLS then gave a communication entitled Extracts of Liver and Yeast: their Varying Efficiency in the Treatment of Macrocytic Anæmias. She explained that two macrocytic anæmias, pernicious anæmia and tropical (or nutritional) macrocytic anæmia, were cured by whole liver or crude liver extracts. Certain yeast extracts were effective in curing the tropical anæmia, but would only cure pernicious anæmia after admixture with normal gastric juice. Castle's theory of the formation of the liver principle by the interaction of an extrinsic and intrinsic factor had been thought to explain the ætiology of these two anæmias. There was much evidence to suggest that the tropical anæmia was a deficiency disease, and there was no suggestion of faulty gastric function. As Marmite (autolysed yeast), a rich source of the extrinsic factor, was curative alone, the deficiency in diet had been assumed to be the extrinsic factor. The rhesus monkey, when fed on a diet based on one in common use among sufferers from the tropical anæmia, developed a macrocytic anæmia thought to be the animal counterpart of the tropical disease. These two diseases, in man and monkey, differed from pernicious anæmia proper in showing no increase in the bilirubin content of the blood, less conspicuous variability in the size of the cells, and the absence of natural remissions. These differences were difficult to explain if the two conditions were due to a lack of the one and same liver principle, but for lack of any evidence of any other factor Castle's theory had been accepted as affording the best working hypothesis.

Dr. Wills, with Mr. P. W. Clutterbuck, D.Sc., and Dr. Barbara Evans (see THE LANCET, Feb. 6th, 1937, p. 311) had studied the nutritional macrocytic anæmia in monkeys and cases of pernicious anæmia. They had found that the anæmic animals responded well to treatment with either liver extract or crude yeast extracts, but that the purified form of the liver factor, Anahæmin, which was curative in true pernicious anæmia was absolutely inactive even in enormous doses in the macrocytic anæmia of the monkeys. Two fractions, one soluble and the other insoluble in ammonium sulphate, had been prepared from yeast filtrates and the liver extract, Campolon. The insoluble fraction from campolon, which would have contained any anahæmin present, had induced immediate remission in two cases of pernicious anæmia but was completely inactive in monkeys. The same monkeys, however, had responded to administration of the soluble fraction. Similarly, anæmic monkeys had failed to respond to the insoluble fraction from the yeast extract, but responded to treatment with the soluble fraction.

There was some evidence that these two factors were both necessary for hæmopoiesis in man and rhesus monkeys, but that in the production and cure of the nutritional anæmia of the monkey the soluble fraction was mainly concerned. Its action in tropical macrocytic anæmia was being investigated.

DISCUSSION

Dr. HAMILTON FAIRLEY said that the macrocytic anæmias played a large part in tropical practice. Three types were thought to exist, the tropical macrocytic anæmia, the anæmia of tropical sprue, and an anæmia apparently associated with malarial infection; this last was probably tropical macrocytic anæmia with malaria superimposed. Tropical macrocytic anæmia had been thought to occur in India, Africa, and China. He had recently been investigating blackwater fever in Macedonia and had seen two cases of anæmia with malarial infection, in a neighbouring ward, which he considered were probably macrocytic anæmia. If that were so that condition must be very common in the Balkans and right through Europe. He asked Dr. Wills about her experience with the anæmia in monkeys. There was, he said, a need for much more work on tropical anæmia.

Prof. F. PYMAN inquired the technique of separating the soluble and insoluble fractions from ammonium sulphate.

Prof. L. J. WITTS asked whether Dr. Wills's soluble fraction was curative in pernicious anæmia.

Dr. JANET VAUGHAN said she preferred to use the less pure preparations of liver extract. Her experience was that she had had to give relatively more anahæmin than of the cruder extracts. She considered that the preparation of anahæmin marked a great scientific advance, but doubted whether it was of such help to therapy. Jacobsen, Fiske, and Subbarow had isolated three principles from liver, suggesting that the whole problem was more complicated than had been thought. From that point of view anahæmin probably did not contain all the principles involved and the cruder extracts would be better to use.

Prof. DODDS asked whether the very pure preparations were excreted very rapidly. He mentioned the greater effectiveness of œstrin in oily solution over that in crystalline form, and wondered whether a parallel were to be found in pure liver preparations.

Dr. S. W. F. UNDERHILL said that theoretically the cruder preparations should act more slowly. One c.cm. of anahæmin had been found to maintain cases of pernicious anæmia in good health when given at six- or even eight-weekly intervals. There must therefore be some power of storage. There was no satisfactory animal test for the potency of the cruder liver extracts. The purer extract showed well-marked constancy in melting point and rotation but there was no reliable chemical or physical test for the cruder extracts.

Dr. WILLS, in reply, said that she too had had difficulty in keeping monkeys alive with a lower red cell count than three million. That level was sufficient for experimental purposes. The results from the soluble fraction, tried in one case of pernicious anæmia, had been inconclusive. She and Dr. Clutterbuck had not yet prepared crystalline material from their fractions.

CUMBERLAND INFIRMARY, CARLISLE.—A scheme of extensions to cost about £162,000 was submitted at the annual meeting of this hospital. Plans and estimates have been forwarded to the Commissioner for the Special Areas, asking for an indication of the amount of grant forthcoming in view of the fact that a great deal of work will be brought to the infirmary from the distressed areas of the county.

ALCOHOL AND THE MOTORIST

A MOCK TRIAL

THE Fellowship of Medicine staged an amusing and instructive Mock Trial in the Barnes Hall of the Royal Society of Medicine on March 11th.

The judge was Mr. W. H. Cartwright Sharp, K.C., and the jury was a decidedly special one, for it contained, among other distinguished persons, three Members of Parliament, a professor of physiology, and a well-known woman novelist.

CASE FOR THE PROSECUTION

A Mr. Samuel Johnson, a middle-aged man with a genial and somewhat detached attitude to life, played with great spirit by Mr. W. W. Anderson, was indicted for an infringement of the Road Traffic Act, 1930, s. 15: being under the influence of drink to such an extent as to be incapable of properly controlling his motor-car.

Mr. W. A. L. Raeburn, counsel for the prosecution, after explaining the nature of the charge and the evidence, called Miss Gladys Smith, a "travelling advertisement for a firm of beauty specialists." She testified that, driving behind the defendant, she saw him fail to start at a green light, drive suddenly across the crossing on the succeeding amber light, and proceed quickly up the steep hill opposite, zigzagging from side to side; she followed him to where he had stopped his car on the off-side of the road and found him leaning back in a semi-conscious state.

P.C. James Maclean (Mr. Keith Attenborough) said that at 10.26 P.M. he had been summoned by Miss Smith and had found the defendant with his head resting on his arms across the steering-wheel, had smelt alcohol in his breath and, suspecting him of being drunk, had taken him to the police station.

Dr. P. B. Spurgin, police surgeon, Blank Division, said that he saw the defendant at 10.53 P.M. The defendant did not get up when he came into the room but consented to be examined. He swayed gently from side to side, said that a policeman had brought him there on foot, and then corrected himself and stated that he had been driven to the station in a car. He had been uncertain about the starting-point and destination of his journey. He was rather flushed and his skin was slightly moist, his eyelids were heavy, and his appearance was sleepy. His tongue was slightly furred and his breath smelt of alcohol, but not strongly. His pupils were rather dilated and their reaction to light very considerably delayed. In trying to touch the tip of his nose he twice missed. His knee-jerks were exaggerated until he realised that they were being tested. He swayed on standing with the eyes shut and the feet toe to heel. His pulse was rather full and the rate was 126 to the minute. Dr. Spurgin had concluded that he was under the influence of alcohol to an extent which made him incapable of properly controlling his car, and had told him so, and that he could send for his own doctor if he wished.

The defendant had sent for Dr. T. R. Snelling, who had arrived at 11.15 P.M. and examined him in Dr. Spurgin's presence. Dr. Snelling had taken two samples of blood in the usual pipettes and had handed one to Dr. Spurgin.

Mr. Laurence Vine, who defended Mr. Johnson, cross-examined Dr. Spurgin, who replied that he would not have certified Mr. Johnson as drunk in charge under Section 40 of the Criminal Justice Act, 1925, but that he was under the influence of drink within the Road Traffic Act, 1930. He was not so drunk that he could not give a valid consent to the examination. Dr. Spurgin agreed that every one of the clinical symptoms, individually, might be due to other causes, and agreed with the finding of the special committee of the British Medical Association that there was no single symptom due to the consumption of alcoholic liquor which might not also be assigned to some other pathological condition. He had not asked the defendant if he suffered from any other condition, though it was usually his practice to do so, and he would have done so to a private patient. If the defendant had taken a dose of insulin two or three hours before the reaction would not necessarily be still apparent, and the symptoms could not have been caused by a dose of insulin taken even an hour before. A diabetic, even though he had taken nothing to drink, could show these symptoms, except the sluggish reaction to light, for this was a particularly important pathognomonic sign of alcoholism. In an alcoholic patient the pupils contracted under light but took a long time to dilate again when the stimulus was removed. A diabetic might have a perfectly normal reaction. Moreover, the diabetic usually had a dry, red tongue. Furring of the tongue might, however, be caused by gastric disturbance, and failure to touch the tip of the nose by any one of several conditions. He agreed that Mr. Johnson's was a borderline case. A disorder of general health was a possible explanation of the clinical picture. He could not make any attempt to apportion the symptoms between alcohol and other causes.

Dr. H. K. V. Soltau, expert for the prosecution, said that he had done the Widmark test on a sample of the defendant's blood. He had devoted himself to this test for two years and had done several hundred estimations. Relating the results to physical conditions, he said that when the blood content was below 80 mg. per 100 g., most authorities agreed that the person was not intoxicated, but if the content was higher his performance of psychological tests and his control of a car in a difficult situation might be affected. With a content of above 100 mg. per 100 g. a normal man was not capable of controlling a car. Men who could drink an abnormal quantity of alcohol were usually found not to have a very high blood-alcohol content. A man who showed 130 mg. would not be fit to meet an emergency. The present specimen had contained 150 mg.

In cross-examination by Mr. Vine, he said he would convict any man on a reading of 150 mg. without any clinical tests or other evidence. He admitted that acetone gave the same reaction as alcohol and might account for 25 mg. in the estimation. Assuming the alcoholic content to be only 125 mg., he had never yet met a man who was not affected by that amount. A recent anæsthetic could have raised the apparent blood alcohol but not by more than 10 mg.

Re-examined by Mr. Raeburn, he said that the highest acetone content likely to be found in a diabetic pursuing his ordinary life was 25 mg., and that 35 mg. was the ordinary maximum for a non-comatose patient. The peak of the blood-alcohol content was reached between half an hour and one and a half hours after drinking, and sooner if food had been taken. The content declined at the rate of 20 mg. per hour.

This concluded the case for the prosecution, and after Mr. Vine had submitted, unsuccessfully, that there was no evidence to go to the jury, he placed the defendant in the box.

CASE FOR THE DEFENDANT

Mr. Johnson said he was a commercial traveller. He did not remember having any difficulty in controlling his car; he had not zigzagged particularly; he had not swayed more than the policeman had; he had not stood up when the police-surgeon had come into the room because he was a Communist. He had not been interested in the tests. He suffered from diabetes and had taken a dose of insulin at about 7 o'clock. He had not told the police-surgeon this. Cross-examined, he said that he had taken a pint and a half of beer, the last glass being about 7 o'clock. He had only had a sandwich or two, and had left the public house at 8 o'clock. A tooth had started to ache violently, and he had gone to a dentist and had it out at 9.30 P.M., after the gum had been sprayed with ethyl chloride. He had taken no alcohol afterwards.

Dr. Snelling, giving evidence for the defence, said that the defendant was his patient and was a diabetic. On examination at the police station he had walked well; his pupils were dilated and reacted slowly to light; he answered questions steadily and sensibly, picked up coins accurately, and counted them correctly. His speech was normal, face flushed, knee-jerks normal; he could touch the tip of his nose at the second attempt. His pulse-rate was 90. Dr. Snelling had concluded he was suffering from an overdose of insulin but was fit to drive. Cross-examined by Mr. Raeburn, Dr. Snelling said that the effect of insulin would not have worn off by 7.30 P.M., but that it would take four hours to reach its peak effect. The maximum overdose short of one producing collapse, after a few sandwiches and three glasses of beer, would be between 25 and 30 units.

Re-examined, he agreed with the words of Conybeare on "Diabetes and Insulin," p. 45, that hypoglycæmic reactions were most likely to take place between 2 and 4 hours after the injection of insulin, but were sometimes strangely delayed. In answer to the judge, he said that the abnormal reaction to light might have been due to insulin.

Sir James Purves-Stewart said that many of the symptoms were consistent with alcohol poisoning, but that every one of them might be due to other conditions, such as emotional shock, excitement on being taken to a police station, exhaustion, belladonna poisoning, and carbon monoxide poisoning. An overdose of insulin could produce all the defendant's symptoms. A patient with over 400 mg. of blood alcohol per 100 g. would be comatose; over 350 mg., stuporous; over 200 mg., hopelessly drunk. With a content of 180 mg. 80 per cent. of persons showed moderate intoxication and 20 per cent. no signs; with over 160 mg., 66 per cent. of persons showed signs of intoxication, and with 100 mg., only 33 per cent. Fallacies of the Widmark test were that other volatile bodies—e.g., acetone—gave the same reaction as alcohol up to 20 or 30 mg. Insulin poisoning was common in a patient who had not taken a proper meal. The Widmark test was inconclusive in this case. Cross-examined, he said that the effects of insulin in the present case would be apparent at 10.30 P.M. Insulin prevented the formation of more acetone but would not reduce the existing content. Three glasses of beer taken at 7 P.M. could account for a blood-alcohol content of 150 mg. at 10.30 P.M.

Re-examined, he agreed that acetone exaggerated the value of the alcohol in the test.

ADDRESSES TO THE JURY: ACQUITTAL

Counsel then addressed the jury. Mr. Vine submitted strongly that they could not convict on the evidence of a test which was so compromised by fallacies and that, as this was admittedly a borderline case, the defendant must have the benefit of the very substantial doubt. Mr. Raeburn pointed out that there was no evidence of the amount of insulin the defendant had taken, and consequently no evidence of an overdose. It was absurd to say that three glasses of beer would have caused such a high blood-alcohol; the defendant must have drunk more liquor during the evening. The judge summed up strongly in the prisoner's favour and the jury acquitted him.

The trial showed signs of careful preparation and fully illustrated the point which the Fellowship desired to make: the ambiguity introduced into evidence based on the Widmark test when the defendant is a diabetic and has recently taken insulin without an adequate supply of carbohydrate, or has recently had an anæsthetic.

LEAGUE OF NATIONS AND NUTRITION

AT the Lister Institute on March 10th Prof. E. J. Bigwood of the faculty of medicine, University of Brussels, and Dr. Hazel Stiebeling, senior food economist, Bureau of Home Economics, U.S. Department of Agriculture, spoke on two aspects of the nutritional work carried out in connexion with the health section of the League of Nations.

Dr. BIGWOOD described the work of the conference of experts meeting in Geneva last December to discuss methods of assessing the nutritional state of children and adolescents. The difficulty was stressed of finding objective tests, other than simple physical measurements, of which the value was very limited. These, which include height and weight in relation to age and sex, physical appearance (slender, medium, or stocky type), firmness and elasticity of skin, state of teeth, state of muscles, and signs of abnormal fatigue, were however considered useful methods for study of large numbers of children and for periodical examinations. It was recommended that small groups of children should undergo a more elaborate examination, which should include inquiries into the diet, family history, a complete medical examination, special tests of blood for hæmoglobin- and protein-content, together with some of the tests recently devised to reveal slight and incipient stages of vitamin deficiency. Such were: for vitamin-A deficiency the dysadaptation test (visual acuity in semi-darkness), for vitamin C vascular fragility and ascorbic acid saturation tests, and for vitamin D X ray examination of epiphyses of bones and phosphatase content of the blood. Dr. Bigwood described with lantern photographs the "posture" test of Prof. Schiotz of Oslo, by which it is claimed that slighter grades of malnutrition are revealed by the lines and contours shown by the musculature of the back.

Figures were given of the results of some of these tests, as carried out in the elementary schools of Belgium. Examinations of this type must, he said, at present be regarded as a subject for research rather than as routine methods, but it is hoped, as a result of more widespread examinations and of correlation of the results obtained in different countries by these methods with those obtained from physical examination, that more satisfactory objective criteria for the state of nutrition might be established.

Dr. STIEBELING spoke of the conference of representatives of National Nutrition Committees, held

at Geneva in February, which she had attended as the United States representative. The aim of the council of the League in calling this conference was to collect information about the status and composition of such committees in the different countries, and about the work done and methods employed "to determine the state of nutrition of the national population and to spread the principles of improved nutrition among the population." Dr. Stiebeling described the extensive and well-controlled nutritional investigations which had been initiated by the U.S. federal government. It was expected that these studies when complete would yield information of the total national consumption of the various foodstuffs in feeding of farm animals and in human dietaries, and of both qualitative and quantitative composition of the average diets consumed in the different income groups in the different States. Few results, she said, are yet available from this inquiry which is both laborious and costly, and will extend over several years. The importance of such work, carried out on an adequately large scale, cannot be over-estimated, and the example set might with advantage be imitated by European countries.

REVIEWS AND NOTICES OF BOOKS

A Manual of Pharmacology

Eighth edition. By the late WALTER DIXON, M.D., B.Sc., F.R.S., sometime Professor of Materia Medica and Pharmacology, King's College, London. Revised by W. A. M. SMART, M.B., B.Sc., M.R.C.S., Lecturer in Pharmacology and Toxicology, London Hospital Medical College. London: Edward Arnold and Co. 1936. Pp. 483. 18*s*.

THIS text-book was not the least of Dixon's many contributions to science in general, and to medicine in particular. It was last revised in 1929, two years before the author's death, and the rapid advance of knowledge in pharmacology has rendered further revision essential.

Dixon's book had certain characteristic features. It was dogmatic in its teaching and on controversial topics gave as a rule only the author's point of view. It contained a large number of illustrative tracings obtained in his laboratory, which fortunately have been retained in the new edition, and it tended to emphasise the scientific bases rather than the therapeutic applications of the subject. More systematic discussion of therapeutics has now been supplied, but the allocation of space does not always correspond with the importance of the subject. Another change is the inclusion of a large number of structural chemical formulæ. The book is, in fact, more complete in this respect than any other of comparable size, and for this reason alone is worth a place on the shelf of the pharmacologist or the chemist. The medical student, however, may feel with some justification that the amount of space devoted to formulæ is often disproportionate to that devoted to the actions and uses of the drugs they represent. The same lack of balance is evident in the amount of information given about different drugs. Thus twenty pages are devoted to aconitine, veratrine and the nicotine, coniine and curare groups of drugs—substances of pharmacological rather than therapeutic interest; and only twelve pages to the vitamins, the hormones (including pituitary, thyroid, parathyroid, suprarenal and liver extracts and adrenaline, insulin, and ephedrine), vaccines, and sera. The use of liver and stomach extracts in macrocytic anæmias, perhaps the most striking therapeutic advance of the last decade, is dismissed in ten lines, while discussion of the cyanides fills six pages. This disproportion is the weakest feature of the present edition.

A commendable innovation is the introduction of several prescriptions, but unfortunately these are not always happily chosen Sodium, potassium, and ammonium bromides have an identical pharmacological action, and a mixture of the three, as in mist. bromid. co. (p. 48) merely adds to dispensing costs without corresponding advantage. Of heroin it is rightly stated in the text that "its use might be forbidden without harming a single genuine patient," and yet a linctus containing heroin is included in the prescriptions. Guy's pill (p. 422) is little used to-day, not because it is inert, but because the dose of digitalis is more conveniently adjusted independently of other drugs, and also because the organic mercurial preparations have largely replaced inorganic mercury as diuretics in cardiac disease. It is, of course, easy to criticise time-honoured prescriptions in this way, but it is surely not the place of the pharmacologist to perpetuate those which, as a result of recent research, are being discarded by modern physicians. The author expresses in his preface a decided preference for the metric system of dosage, and yet in the prescriptions, and indeed throughout the text, the Imperial system is used almost exclusively.

The book has been brought up to date in several important respects, as by reclassifying drugs acting on cholinergic nerve-endings (although few would include histamine among these), and by describing newly introduced substances such as ergometrine, mandelic acid, yatren, and cyclopropane.

Pneumonia

Diagnosis and Treatment. By CAMPBELL P. HOWARD, B.A., M.D., C.M., F.R.C.P. & S. Can., late Professor of Medicine, McGill University, and Physician to the Montreal General Hospital. London: Humphrey Milford, Oxford University Press. 1937. Pp. 373. 31*s*. 6*d*.

THIS book is written rather in the Germanic fashion. The wealth of data is well summarised, but a general lack of critical analysis and correlation of recorded work gives the impression that the author has not himself actively participated in the recent advances in diagnosis and treatment of pneumonia. The inclusion of 340 references accurately quoted in the 235 pages devoted to lobar pneumonia indicates, however, that he has read widely, although British work receives scant attention. Griffith's pioneer work on mutation of pneumococcus types, for example, is not mentioned, while there is no reference to the report to the therapeutics trial committee of the Medical Research Council on the serum treatment of lobar pneumonia.

After a historical introduction, succeeding chapters deal with infection and immunity, morbid anatomy, symptomatology, physical signs, complications, diagnosis, prognosis, and treatment of lobar pneumonia. There are numerous statements throughout the text which are at variance with current practice and belief—e.g., p. 24, "in most clinics at the present day Blake's precipitin mouse method is the one employed"; p. 30, "carriers of fixed types are rather frequent among the population at large"; p. 33, "all are agreed that the virulence of the pneumococcus varies greatly from year to year." In the

chapter on treatment the indications for and against serum therapy might have been marshalled together with the methods for rapid pneumococcus typing. The two concluding chapters deal with broncho-pneumonia and the common cold, the last one being perhaps the best in the book.

Textbook of Medicine

Third edition. By Various Authors. Edited by J. J. CONYBEARE, M.C., M.D. Oxon., F.R.C.P., Physician to Guy's Hospital, London. Edinburgh: E. and S. Livingstone. 1936. Pp. 1027. 21*s*.

Conybeare's text-book, which includes contributions by physicians from five of the London teaching hospitals and from places as far separated as Lucknow, Johannesburg, and Toronto, has now completed its second four-year cycle. It is a middle-weight among medical text-books, "offering the essentials of medicine within as small a compass and at as low a price as possible." The teaching is clear, concise, and sound, and compression has not been applied to the extent of producing serious distortion. The new contributors in the third edition are Dr. P. M. F. Bishop, clinical endocrinologist at Guy's Hospital, and Dr. W. D. W. Brooks of St. Mary's, who collaborates in the section on diseases of the chest. Much rewriting has been done by the other authors, including a complete recasting of the renal diseases section by Dr. A. A. Osman, who now follows Fishberg fairly closely. A short section on common skin diseases, doubtless in order to keep the price of the work low, is entirely unillustrated. We have no quarrel with its quality, but it seems a pity to try to teach dermatology without pictures, and we doubt whether the fundamental unity of dermatology with general medicine will be made evident to the student by these fifty pages. It is difficult enough, in the present state of our knowledge, to display this unity even to those of greater experience! Perhaps here condensation has gone a trifle too far, but that is minor criticism of a very serviceable book.

Frigidity in Women

Its Characteristics and Treatment. By Dr. EDUARD HITSCHMANN, Director of the Psycho-analytic Clinic in Vienna; and Dr. EDMUND BERGLER, Assistant Director of the Clinic. Authorised translation by POLLY LEEDS WEIL. New York: Nervous and Mental Disease Publishing Company. 1936. Pp. 76. $2.

THE appointments held by the authors of this work entitle their views to respect. Their thesis is the psychical nature of frigidity, which they regard as a pathological inhibition not only preventable but curable. In successive chapters they describe the development of female sexuality, the characteristics of the female sexual life, the symptomatology, degrees, and types of frigidity; an account is given of two patients to illustrate success following treatment by psycho-analysis; and lastly we are told how frigidity may be prevented and treated.

Upon the reader untrained in the technique of psycho-analysis and unfamiliar with its basic theoretical propositions, this book will make a complex impression. He will recognise from the descriptions many female types and feminine reactions with which he is familiar; and, despite the absence of any numerical records of successful cases, he will be impressed by the cures which the authors seem to have effected. At the same time he will find it difficult to accept the generalisations on the normal course of female sexual development upon which are based the diagnosis and treatment here described. The average reader, if he is not staggered with incredulity, will regard the circumstantial account of "penis envy" as a normal phenomenon, subject to what, in another context, Prof. Whitehead has described as "the fallacy of misplaced concreteness." For descriptive convenience the concrete term is admittedly always preferable to the abstract. If a little girl hates being a little girl, likes to dress and appear as a little boy, and adopts an aggressive, masculine attitude to the world, it is perhaps more convenient to describe her attitude by the term "penis envy" than by other less concrete terms. In some cases, however, the concreteness of the language, which is always disturbing to established ideas, appears to be inspired by a seemingly infantile desire to shock. It is tempting to administer to mulishly hostile and indignant critics, outraged in their conventional ideas, further shocks. Among other pleasing consequences is the prospect of their powers of invective being eventually reduced to impotent inarticulateness.

Though indifferently translated, this book may be read with profit by the larger circle of physicians to whom it is intended to appeal if they are willing to make allowances of the kind described.

Recent Advances in Anæsthesia and Analgesia

Second edition. By C. LANGTON HEWER, M.B., D.A., Anæsthetist and Demonstrator of Anæsthetics, St. Bartholomew's Hospital. London: J. and A. Churchill Ltd. 1937. Pp. 284. 15*s*.

THERE has been considerable progress in the practice of anæsthetics during the five years since the first appearance of this book, and to bring it up to date Dr. Hewer has had to add eighty-five pages even after he has discarded matter now obsolete. The newest agents, cyclopropane, divinyl ether, and pentothal sodium, are fully discussed, as are also the interesting possibilities of electric anæsthesia. A chapter each is devoted to thyroid and thoracic surgery, subjects on which Dr. Hewer can write with the authority lent by special experience. Besides a chapter on carbon dioxide, which was to be expected, the author has added one on oxygen therapy. The fact that the anæsthetist's help is seldom requisitioned in this country for the purpose of oxygen administration, far from making this chapter unnecessary or inappropriate, suggests rather that his familiarity with the kind of apparatus used might make him a useful arbiter when methods are being debated. The book as a whole is well compiled and produced, and will make an appeal to the senior student as well as to the specialist.

Pediatric Nursing

By JOHN ZAHORSKY, A.B., M.D., F.A.C.P., Professor of Pediatrics, St. Louis University School of Medicine. Assisted by BERYL E. HAMILTON, R.N., Graduate of St. Luke's Hospital, St. Louis. London: Henry Kimpton. 1936. Pp. 568 16*s*.

THIS in an ambitious work, and the first reaction of many medical practitioners to a study of its contents will be a fervent prayer that they may never have to work with a nurse who is fully conversant with its contents—her superior knowledge would be unbearable. A closer inspection reveals that the details given in the earlier parts of the book under the general title of "The Science" are included so that the nurse may better understand the why

and wherefore of the procedures described in the second part dealing with "The Practice." This latter is the more valuable part of the book, and novel chapters are included dealing with the organisation of a pædiatric department and of the nursery and with "the home and the family," a part of the world often forgotten by the hospital nurse. The details on feeding have the usual disadvantage for British readers of being based on comparatively unfamiliar material; but English readers will note with satisfaction that the illustrations of typical stools are from specimens passed in Great Britain.

Birch's Management

And Medical Treatment of Children in India and the Tropics. Eighth edition. By Lieut.-Col. E. H. VERE HODGE, B.A., M.D. Cantab., M.R.C.P. Lond., Professor of Medicine and Lecturer on the Diseases of Children, Medical College of Bengal, Calcutta, and First Physician to the Medical College Hospitals. Calcutta: Thacker, Spink and Co. (1933), Ltd. 1936. Pp. 377. Rs.7/8.

VERY few medical text-books can have stood the vicissitudes of over ninety years, and though "Birch's Management" has passed through several hands since it first saw the light as a small, privately printed pamphlet in 1844, it has managed to retain much of its original character. It is directed primarily to all those who have charge and care of children in the tropics, and who are out of reach of immediate specialist advice. It follows that much of its content is concerned with general pædiatrics rather than with tropical medicine, and that the author has had to cater both for the intelligent layman and for the practitioner who has no special training in children's diseases. A sensible compromise has been effected by marking certain of the more technical sections as being intended for practitioners, and by defining a number of common medical terms in the text. With the exception of one or two slips (e.g., that the tumour in pyloric stenosis will be found high up on the left side), the book is clearly written, reliable, and well-balanced. It is easy to appreciate what a stand-by it must have proved to generations of parents, missionaries, and nurses.

A Text-book of Medical Bacteriology

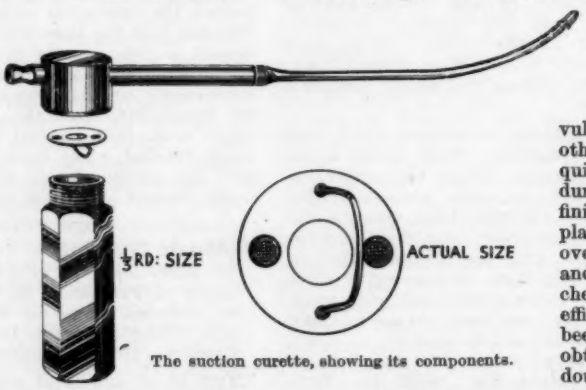
By R. W. FAIRBROTHER, D.Sc., M.D., M.R.C.P., Lecturer in Bacteriology, University of Manchester. London: William Heinemann (Medical Books) Ltd. 1937. Pp. 437. 15*s*.

THIS short text-book of bacteriology is likely to become popular with medical students because, though written on conventional lines, it is a clear, up to date, and readable account of those parts of the subject on which questions are asked at qualifying examinations. The author has been wise to relieve his text of much of the technical detail which makes many otherwise good bacteriological manuals difficult for the student. There are practical classes in which he should learn technique, and if he does not make use of this opportunity it is not likely that he can make good the deficiency from books. As in nearly every other elementary text-book of bacteriology there are too many subjects nibbled at, but not bitten into. The paragraphs on some of the rarer infections are too short to be informative, and surely the mention of such obscure principles as the Forssman antibodies, leukins, and plakins is out of place in a book for elementary students.

NEW INVENTIONS

COMBINED DIAGNOSTIC SUCTION CURETTE AND UTERINE SOUND

ONE of the greatest difficulties experienced during two years research work with œstrin at the Royal Infirmary, Bristol, was to get curettings on a definite day of the cycle. To overcome this difficulty I designed a suction curette and collecting bottle, the use of which simplifies the technique so much that now patients can be curetted at a moment's notice in the out-patient clinic, and a specimen of endometrium taken with ease under nitrous oxide for unmarried girls, and 1 per cent. novocain locally for married women.



The suction curette, showing its components.

The instrument has a blunt, tapered sound-like tip 5·5 mm. in diameter, with an anterior and posterior cutting edge of stainless steel brazed to a malleable copper tube 4·25 mm. in diameter and 6½ in. long, with an anteroposterior eye just behind the cutting edge. The malleability varies, being soft near the cutting edge and hard at its junction with a wider tube to which it is joined by a screw thread with milled nut. The wider tube leads straight to the collecting bottle of brass which is fitted as a pistol grip for the instrument. Suction is applied to an outlet in the same line as the tube, and this is obtained from a water-suction pump. The collecting bottle is fitted with a small trap which prevents any endometrium being sucked over even if the bottle is overflowing with blood, or with saline sucked in through the eye to wash through all the particles. A suitable expanding speculum and a one-toothed vulsellum are the only other instruments required for the procedure. This instrument, finished in chromium plating, is compact—over-all length 10¾ in. and handle 4½ in.—cheap, easy to use and efficient, and it has been useful also in obtaining curettings in doubtful cases of uterine growths.

I am indebted to Mr. H. L. Shepherd for his encouragement and coöperation. The instrument was made for me by Messrs. Ferris and Co., of Union-street, Bristol.

G. L. Foss, B.Chir. Camb.,
Clinical Assistant to the Gynæcological Out-patient Department, Bristol Royal Infirmary, and Colston Research Fellow.

THE LANCET

LONDON: SATURDAY, MARCH 20, 1937

THE "EFFICIENCY ENGINEER"

In many modern industrial processes human activities have become almost mechanical—a series of actions to be repeated thousands of times during the working spell. If the human being be regarded solely from the mechanical aspect, the total amount of the working day can thus be reduced to units of performance of the same task, which can be timed. Then, if a normal timing can be found which takes into account the longer time taken by the slower workers to perform their units, a rate of performance for each unit of work can be arrived at, to which the slowest worker might be expected to work without undue physical or mental stress. The faster workers, who can exceed the average and do more units of work in a fixed time, have an increased power of output which they can, and do, sell willingly to management, and for which employers are prepared to bid. There are various systems of this sort now on trial of which the Bedaux system is an example.

Systems of payment by piece rates are not new. It has long been recognised as fair that capacity to work easier and better than the ruck should be rewarded, but piece-rate payments based on time motion study are comparatively modern, though time motion study itself is no new thing. It dates from the days of Taylorism; and the time motion studies of industrial physiologists or psychologists have done a great deal towards economising effort, much to the advantage of employees in increased contentment and efficiency. When the "efficiency engineer," however, began to gain a footing in industry, and the figures on which he estimated the length of time in which a particular piece of work should be done were accepted by management, and piece rates based on them, there was at first considerable protest from trades unions. There is always a danger of "speeding up" if extra payment for performance above a certain standard is the chief incentive to work, especially if the time of performance of each unit and the standard to be reached before extra payment is earned are fixed too arbitrarily. The danger is the interference with the ordered working of the whole organism, and whilst there is no reason to believe that the so-called efficiency engineers, who are chiefly responsible for introducing these innovations, have not taken physiological advice, it is not so certain that employers will be equally alive to the danger of "speeding up" those of their employees who are only possessed of average or even of subnormal ability. It is, in fact, known that the first fruits of introducing such incentives to efficiency have often been the elimination of the slower workers—a fact which has hampered physiological investigation, as these are the workers who might be expected first to show effects of strain. Again, there is nothing inherently unfair in endeavouring to retain only the most efficient workers or in rewarding work in proportion to its efficiency. Such a policy, however, if bureaucratically applied, may easily lead to strain on the average worker, and we are glad to learn that the Industrial Health Research Board are investigating conditions of work where "speeding up" may be possible, with a view to discovering where the occasions for strain exist—and might be abused.

To the "efficiency engineer" the human body may be a machine—it is in fact a most flexible machine—but it is to the physiologist, the psychologist, and the general practitioner that the results of abusing the machine come. They know that units of human work cannot be ticked out like seconds on a clock; they know, too, that variations exist not only in a group but in each individual of it. Mr. S. WYATT, one of the investigators of the Industrial Health Research Board, with his colleagues, was one of the first to demonstrate variations in the hourly output of workers engaged in monotonous work. Others have shown the effects of adverse environmental conditions, such as inadequate lighting, heating, or ventilation. If the group varies, how much more does the individual vary in those personal qualities of temperament and ability on which uniformity of work so greatly depends? And how responsive is the human worker to understanding guidance? The right person in authority may better the best devised financial incentive to work. Social health is perhaps only on the periphery of the preventive medicine target. There is a danger, nevertheless, that conditions of work which lead to "speeding up"—which dangle before each individual a financial incentive, like a bunch of carrots before a donkey's nose—may create so many selfish individuals as to impair the mental outlook of an industrial people who have owed their greatness, at least in some measure, to the pursuit of altruistic ideals.

THE TONGUE OF THE DEAF

Of all sense deprivations only deafness cuts off a person from his fellows, because deafness—unlike blindness, loss of taste and smell, and loss of touch—imposes a burden not only upon the possessor but upon his normal companions. A partially deaf person compels us to speak loudly; and with the stone deaf, even when they are skilled lip-readers, we feel obliged to enunciate our words more deliberately than usual. Consequently the deaf are often thrown back for companionship upon the society of those who share their disability. In the annual report of the National Institute for the Deaf, a project for founding of Leagues for the Hard of Hearing is discussed with the aim of bringing deafened people into touch with each other. Many of them feel their isolation keenly and would welcome social gatherings at which no one need feel at a disadvantage. The idea

is to establish a league which would meet regularly at the headquarters of the institute in Gower-street; in other parts of the country local branches could be formed, the deaf meeting at first in each other's homes, and later engaging premises as their numbers increased. Besides the social advantage of these gatherings they would afford opportunity for practice of lip-reading which is an art of inestimable value to the hard of hearing even if they ultimately have to learn a sign language for use on occasions where they cannot conveniently face their companion.

Is it desirable to teach sign language to children as well as lip-reading—an evergreen subject of debate, recently revived in the *Times*? Among the deaf themselves there seems to be no doubt that the use of signs may prove a convenient short cut, especially for those who find particular difficulty in lip-reading. Nor, as more than one correspondent insists, need the gestures be other than graceful and significant. The Rev. ARNOLD HILL PAYNE went so far as to claim that the sign language "is far more expressive, facile, and beautiful than the English of even Shakespeare or the Authorised Version of the Old Testament." None the less, the fact remains that to the ordinary person the sight of a roomful of people gesticulating, however competently, is grotesque, and does nothing towards bridging the gulf between the deaf and those who hear. Miss A. B. S. SPRIGGE, in an article in the January issue of *Speech*, sums up the importance of lip-reading, and of speech, for those born deaf in a telling sentence: "I realised that unless I did something very drastic, in order both to improve my speech and get a wider vocabulary, I should never achieve my ardent desire to have as normal a social life as possible, to enjoy friendships, and to meet artists in connexion with my work." Her account of her own education in lip-reading and speech is one of laborious and steady effort, richly rewarded. It is easy to see that many of the deaf may lose heart when faced with the prolonged study which goes to make a capable lip-reader with intelligible speech; and many may take refuge, perhaps too readily, in the sign language which can be so much more quickly and easily learned. But for those who can, and will, make the effort the gain in normal social intercourse is so great that it may well be better to avoid teaching the sign language to the deaf until years of patient training have shown that no other speech is likely to be acquired. Deaf persons of high intelligence will be quick to realise the advantages of normal speech and will make the necessary effort. Those among them who have any hearing at all for the voice, if only for vowels shouted close to the ear, will in the future be able to supplement the instruction they receive from sight and touch by the use of a sound magnifier. This will not lessen, indeed it may intensify, the effort required, for they will have to learn to interpret and evaluate what they hear and correlate it with what they see and feel. But the results of an experiment with magnified sounds carried out by Dr. PHYLLIS KERRIDGE in coöperation with Dr. A. G. WELLS and recorded in the green book published to-day by the Medical Research Council[1] shows that an immense improvement in speech may follow the combination of aided hearing and lip-reading.

SYPHILIS A MAJOR PROBLEM

THE report of the Royal Commission on Venereal Diseases in 1916 and the spread of venereal infection during and after the late war aroused general interest in measures designed to combat this menace to society. The public conscience was further stimulated by skilful propaganda. To-day, however, the position is reversed; propaganda has in recent years been less intense, and interest is waning. There is a tendency, perhaps, to be a little too complacent about the partial success of the campaign. In the United States, on the other hand, a more pessimistic outlook prevails, as may be seen in two letters we have received from a correspondent in that country.[2]

The first of these was based on a meeting of health officers held last April and the papers then delivered have since been published at length.[3] In one of them Dr. EARLE MOORE said that in the States each year no less than 1,140,000 patients with syphilis come under treatment for the first time, of whom 518,000 are suffering from early and presumably infectious manifestations while 596,000 are in the later stages of the disease. From the available evidence he concluded that less than half the syphilitic patients are treated during the infectious stages—a state of affairs he attributed to public ignorance, to failures in diagnosis, and to the fact that symptoms are often absent or slight during the period of invasion. MOORE believes that this annual figure of over a million new patients would be increased to three millions if all possible steps were taken to discover those who are infected: he estimates that at any one time 12,000,000 persons in the United States are suffering from syphilis, of whom only 683,000 are under treatment or observation. The suggestions made for grappling with this appalling problem were considered by other contributors to the symposium: they fall into four main groups—namely, the finding of cases, the education of patients and public, the education of the medical profession, and the provision of better facilities for attendance by patients and for diagnosis and treatment by practitioners. Case-finding is to be achieved by the zealous tracing of contacts and by introducing blood tests as a routine for all persons attending hospitals or public institutions. MOORE says he showed in 1923 that before the introduction of such tests no less than 5000 patients suffering from syphilis passed annually through the in-patient and out-patient departments of the Johns Hopkins Hospital without their infection being recognised. For the benefit of those who believe that such a routine test is undesirable or impracticable he points to the fact that in hospital obstetric work it has achieved a remarkable reduction in the

[1] *Spec. Rep. Ser. med. Res. Coun., Lond.* No. 221. London: H.M. Stationery Office. 1937. Pp. 137. 2s.
[2] See *Lancet*, 1936, 1, 1083; Feb. 20th, 1937, p. 466.
[3] *J. Amer. med. Ass.* Sept. 5th and 12th, 1936.

incidence of congenital syphilis. Dr. VONDERLEHR, writing on the education of the public health officer, recommends that those who combine clinical experience in the diagnosis and treatment of venereal diseases with an intense interest in the subject should be enabled to give their whole time to the organisation and coördination of venereal disease services. Dr. J. H. STOKES, however, wisely maintains that ultimate success depends on the coöperation of the ordinary medical practitioner, since not even the most widespread organisation will provide clinics that are accessible to all, and there will always remain a proportion of patients who insist on treatment by their private doctors. He believes, therefore, that the most important of all measures is the early instruction of the practitioner, who must not only get a thorough grounding at his medical school, but must have every possible chance of gaining practical experience at a clinic.

In his annual report for the year 1935 the chief medical officer of the Ministry of Health refers to the continued decline in the number of cases of infectious syphilis attending public clinics in this country and expresses the opinion that this is a true reflex of diminution in the incidence among the population. This opinion is of course based on convincing evidence, which leaves no doubt that in this respect we are much more fortunately situated than are the peoples of the United States. The evidence would be even more conclusive, however, if it were supported by recent figures showing the incidence of latent or undiagnosed syphilis among various sections of the population. A repetition of the type of serological investigations carried out by FILDES and by COLLIE, who reported to the Royal Commission of 1916, and by ASSINDER[4] in Birmingham, would give useful information and supply material for a comparison with the present situation in the United States and with the situation in this country twenty years ago.

MEDICAL RESEARCH

To weave the changing design of current medical research on the framework of a command paper is a task for a craftsman. The administrative staff of the Medical Research Council deserve gratitude for their skilled exposition year by year of investigations completed, still in progress, or only projected. The actual arrangement of the report varies little from year to year; the classification adopted, partly topographical and partly topical, is well designed to provide a readable document and to show without wearisome overlapping the interlacing of the studies in progress at different places. It so happens that much of the distinguished work outlined in the introduction to the report, which is summarised on page 709, is already familiar to our readers through its original publication in THE LANCET or through editorial comment. There is much to be gained from a retrospect, in proper perspective, of discoveries whose significance has since been confirmed and extended. It is highly encouraging to find how often hopes modestly expressed have been justified and claims made with diffidence have been substantiated. No doctor, however, least of all a doctor in practice, should be content with a summary of this absorbing report. For three shillings he can obtain an index to the fine contributions of this generation of British workers to medical progress; and its study will effectively disperse any doubts whether the parliamentary grant-in-aid, this year amounting to £165,000, is being spent to good advantage.

[4] *Bgham med. Rev.* 1914, 76, 137.

SIR AUSTEN CHAMBERLAIN

THROUGH the sudden death of Sir AUSTEN CHAMBERLAIN on Tuesday last, a great figure in the political life of this country has been lost. Not long since, in times of the gravest international difficulty, he exercised a driving power for a grand settlement of the discords following the war, which foreshadowed at its inception noble results. The Locarno Treaty has not, as alas all know, effected its high purposes, but it represents the finest effort made for peace since the Armistice, and the principles laid down at its counsels will yet have their influence, though economic crises have since occurred with disastrous effect on its ideals. By his work at Locarno AUSTEN CHAMBERLAIN will always be remembered. We make no attempt to detail the events of his long eventful political career—he received congratulations on his maiden speech from GLADSTONE and held all the high offices under the Crown save the Premiership of which his own generosity deprived him. His labours at Locarno, though now frustrated, will bear fruit in the future, while his example of consistency to high ideals, of immense industry in administration, and, above all, of personal self-abnegation, make of him a noble character in British politics.

Always inspired by the memory of his father it was inevitable that Sir AUSTEN CHAMBERLAIN should have close at heart the status, the well-being, and the progress of our colonial dependencies. The father's achievements in the field of tropical medicine were marked with all the qualities of personal character which lift the statesman above the politician, and to those qualities the son succeeded. The father had seen in the devastations caused by diseases peculiar to the regions one of the chief obstacles to the development of our tropical and subtropical dependencies, and the outcome was the foundation of the London School of Tropical Medicine some thirty years ago. Mr. NEVILLE CHAMBERLAIN, as Minister of Health, laid the foundation-stone of the new building in 1926 and in 1932 Sir AUSTEN accepted the position of chairman of the court of governors of what is now the London School of Hygiene and Tropical Medicine. He interpreted his responsibilities in the same spirit in which he had interpreted his high charges as statesman. In order that he might obtain an intimate knowledge of the activities of the school he suggested that he should become a member of the board of management, and in the result attended meetings of the board

with the greatest regularity, and gave close personal attention both to the business management of the school and the work of the scientific staff. The incorporation of the Ross Institute with the London School of Tropical Medicine in 1934 was largely due to his influence. It was typical of the pains which he took to acquaint himself with the affairs of the school that, whatever the other claims on his time might be, he attended the annual students' dinner, devoting the evening to talking with individual students. The school is yet a young institution and thus suffers from the lack of endowments. It was always Sir AUSTEN'S hope that an adequate endowment fund for the school would be created, and meanwhile he was tireless in his efforts to secure year by year donations and subscriptions such as might enable the school not only to balance its accounts but to meet urgent demands for expansion of its activities. Some years ago Sir AUSTEN gave a further example of his deep and practical interest in the progress of medicine when he became chairman of the governing body of the British Postgraduate Medical School. Here again he was not content with any ornamental rôle but acquainted himself thoroughly with the affairs and personnel of the institution. Medicine loses in him a tried and valuable friend.

THE confusion that may arise between symptoms due to alcohol and to the after-effects of insulin in connexion with motoring offences was well brought out in the mock trial organised by the Fellowship of Medicine which we report in this issue. An actual case demonstrating this confusion was heard last week at Bow-street police-court and is the subject of comment on p. 716.

ANNOTATIONS

DISEASE PREVALENCE IN U.S.A.

EACH state of the U.S.A. has its own health laws, public health services and officers, and most of them issue reports of their own. But the federal government exercises control over matters common to all the states and everything connected with migration from state to state, or from foreign countries. So it comes about that the annual report of the Surgeon-General is one of the most important of all health reports, not only to Americans, but to Europeans and, along with the report of the health commissioner with the Government of India, is looked upon as the chief annual record of epidemiological history. This year the report [1] is by Dr. Thomas Parran in succession to Dr. H. S. Cumming who retired in 1936 after 42 years' service, during 16 of which he was surgeon-general. From this report we derive much of our knowledge of the influence of western civilisation on diseases originating in the east, for the States are the birthplace of most new infections and of modification of old ones. It is, therefore, to be regretted that since the financial crisis the surgeon-general's report has been cut down so much that it is difficult to follow, save by those who are familiar with the official and semi-official reports of the American local health officers.

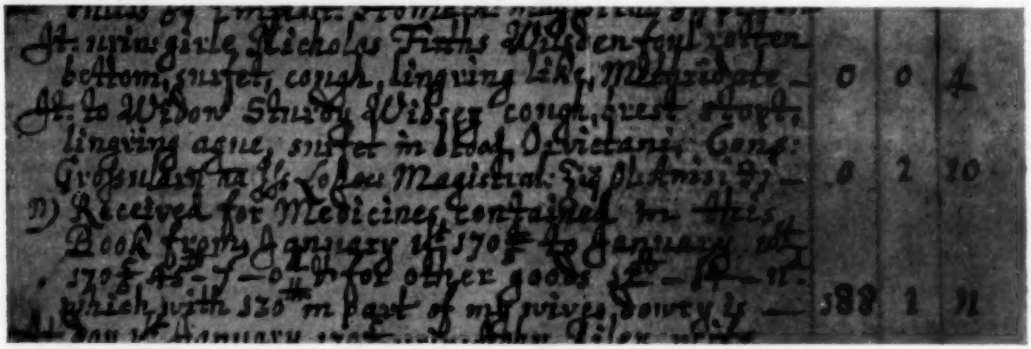
To us the chief interest of the report lies in the division of scientific research and the epidemiological studies. Investigation has revealed an "appalling number" of deaths from coronary occlusion, especially among white males below the age of 50. An increase of deaths in comparatively young people from forms of cardiac disease formerly ascribed to senile degeneration has also been noted in this country. The observation that rats depleted of vitamin B are more susceptible to rat leprosy may have important bearing on the control of human leprosy. It has long been clear that the St. Louis epidemic of 1933 was not the encephalitis lethargica of Economo; further research suggests that the Los Angeles epidemic of 1934, at the time reported as poliomyelitis, was due to a fourth virus disease of the central nervous system. Plague was introduced into North America at the beginning of the century and quickly became endemic in ground squirrels; the disease is spreading eastwards amongst native rodents, but human cases are not common. In 1935–36 only four human cases were reported. An important new fact is that the human flea carries *Pasteurella pestis* and will bite reservoir animals such as prairie dogs (marmots), as well as coyotes and deer. At least four forms of typhus (rickettsia) occur in the States, of which Rocky Mountain fever is peculiar to the region from which it takes its name; this is spreading in extent and of the two forms one is highly fatal, the other benign. Tularæmia is another disease first recognised in man in the Rocky Mountain region, but now known to be common in parts of Europe.

The health statistics are cast for the calendar year 1935, which was a record year for good health in the States. The death-rate (for the 25 states furnishing data) was 10·8 and the infantile mortality 52. The maternal mortality, however, was still at the high level of 5·3 per 1000 live births. New low death-rates were recorded for typhoid fever and diphtheria, but poliomyelitis was severe with a total of 10,839 cases reported, against 7517 in 1934 and an average of 8249. Of recent years, poliomyelitis has been exceptionally well notified in the States; the difference between the reported incidence in America and in Britain, where notification is still faulty, is therefore partly fictitious.

[1] Annual Report for 1936 of the Surgeon-General of the Public Health Service of the United States. Washington: Government Printing Office. 1936. Pp. 158. $1.

AN EIGHTEENTH CENTURY DOCTOR'S NOTEBOOK

"Till October 31st 1703 in old Note Book" are the words written at the top of the first page of an eighteenth century doctor's daybook, which has come into our hands through the courtesy of Mr. Thomas Ottaway, coroner for St. Albans. The closely written pages of regular script which follow are of interest, for they give not only a detailed record of the money which the writer received day by day, but also reflect something of his way of living and working. As will be seen, an entry usually consists of the name and address of the patient, a short pithy description of the symptoms, the prescription and/or treatment, and then the fee. Most of the entries begin with the word "Urin" which would seem to suggest that a great deal of the doctor's treatment was based on uroscopy. The urine is often described as having a "foul viscous bottom."



He does not seem to have visited his patients often, at any rate he rarely records a visit. His usual fees vary from a few pence to somewhere about seven shillings. The most prevalent diseases among his patients were "aguish fever," "canker in gums," "windy pain in body," "inflamed ulcerated legs," "stopt brest" and a condition described as "lingring-like." There was a fair amount of scurvy and "rheumatismus" and over and over again we find the words "consumption feared." "A surfet of raw fruits" seems to have been a common disorder among children. But "Robert Spence's son" died of an illness which seems to have baffled and perturbed the doctor. It is described as "lingring convulsion, fits like possession, joynts lost, witchcraft feared." The writer does not seem to have undertaken any obstetrics. But after all, though the male accoucheur had already begun to find favour in London, the provinces were still prejudiced in favour of the midwife, as shown by the experiences of Dr. Slop, several years later, in the household of the enlightened Mr. Shandy. Sometimes our doctor says of a woman that she "may be impregnate" but he always seems to be actually treating her for some other condition. Other fees which the doctor received are £3 4*s*. 10*d*. from a patient for "advice and tabling for eight weeks" and 3*s*. 6*d*. from the overseers of the poor "for my horse and my own pains in going to Wakefield and Pontefract about Tim Hughes' triall." Another entry suggests a happy relationship between doctor and patients and a pleasant method of collecting fees—"Recd. of severall persons, a voluntary gratuity when our friends came to visit us in all £6."

At the end of each year the doctor sums up his financial position and in the first of the Decembers in his new notebook he writes "received for medicines contained in the former Note Book and in this from January 1st 1702–3 to January 1st 1703–4 £50 18*s*. 2*d*. and for other goods £17 14*s*. 8*d*. being in all the sum of £70 12*s*. 9*d*." He seems to have married some time in 1705 a woman of some property for in his grand total at the end of that year is included a new item "£130 in part of my wive's dowry" and soon after there begin to appear receipts for rents, "Recd. of Abraham Miller Skivcoatt Green his Rent due to my Wife at Whitsuntide last £4. 5. 0." The system of deducting taxes at source seems to have been in force then and some of the rent receipts are elaborate. "Received of John Pickles in Allerton his Rent due at Martinmass last deducting for poor assess, 8/– Land tax for half year 10/11½ Constable lay 2/2½ Mr. Hayles Rent 12/2½ window monies 3/– Church bag 2/6 at Court 2*d*. Mrs. Midgley rent 1/4 for stable setting 2 days 1/– gave him 11½*d*. in all £2. 3. 0½ with R.R. and J.D. rents £4. 10 from £11. 2 there remains £4. 8. 11½."

Not all the entries are strictly medical: as when the calf of the starned cow is sold for five shillings, or Henry Farrer of Lower Mill is let a cow's milk for one year for 16*s*. When an animal is slaughtered Joseph Lister bought "a fourth part of a fat cow besides the hide and tallow" for 15/, while John Garnet had some of the "worse tallow." Many other homely details suggest a varied and pleasant life among congenial surroundings.

THE DISEASES OF WILD ANIMALS

THE study of disease among wild animals has until recent years been confined chiefly to those important human or domestic animal infections, such as plague, tularæmia, sleeping sickness, nagana, typhus, and leptospiral jaundice, that are carried by various wild mammals. The disease of the small mammals, chiefly rodents, used for laboratory work has more recently attracted attention. Experimental epidemiology with white mouse populations has already thrown light on the processes by which epidemics come about—still one of the major mysteries of medicine. The subject is finding a new extension by the discoveries of animal ecologists, who find that disease is a widespread natural phenomenon in nature, and especially among wild mammals, which suffer from rather violent fluctuations in population associated with periodic mortality on a large scale. The annual report [1] for 1935–36 of the Bureau of Animal Population at Oxford University summarises some of the methods by which wild animal populations are being studied. The approach is along three lines which cover the whole field of population dynamics. The chief animals studied by this bureau are the vole or field-mouse, the partridge, and the American snowshoe rabbit, all three being species with strongly marked cycles of abundance and scarcity, periodic outbreaks of disease, and at the same time general economic importance. Problems of census have necessitated the invention of entirely new methods for estimating density, while the powers of increase are calculated from information obtained about reproductive powers, length of life, and breeding seasons. The third phase of study, mortality, falls into the domain of pathology, with some ecological work on the question of predator control. Of special interest is the intensive study being made of fluctuations which occur every three or four years among wild voles (*Microtus agrestis*) on the Welsh and Scottish

[1] Annual Report of the Bureau of Animal Population (University Museum, Oxford) 1935–36. Pp. 1–48.

hills, for which purpose consignments of live voles are trapped and shipped to Oxford, where Dr. A. Q. Wells, the Bureau's pathologist, working under Medical Research Council auspices, is undertaking a study of their diseases. One of the special features of these wild animal fluctuations is that they can be precisely followed in the field, and since the onset of periodic mortality is associated usually with high densities at the peak of each cycle, there are opportunities for finding some of the conditions in the early stages of an epidemic—a thing which is very difficult to do in human epidemics. The experimental side of the work has become possible through the domestication of the vole, as an easily maintained laboratory animal. This stage of the work has taken several years. The vole, having a rather different biological character from that of other small rodents commonly used in the laboratory, has an additional value for general pathological work. The Bureau is contemplating the study of other species in the future, and the report mentions the possible importance of extending the present number of laboratory animals by the conversion of wild rodents and insectivores for this purpose—a special job requiring an intimate knowledge of the habits and ecology of each species.

Such population research has to be maintained for long periods if it is to yield successful results: in this respect one is reminded of meteorology and its need for comparable observations at different stations over many years. It is therefore satisfactory that Oxford University, in conjunction with other bodies, has made arrangements to guarantee the central costs of the Bureau's work for a period of five years at any rate. In addition to the research side of the Bureau's activities, mention should be made of its work in assembling the literature on wild animal populations. A useful list of recent literature is appended, and it is stated that this can be obtained by research workers independently from the main report. A feature of this list which strikes the eye is the world-wide distribution of field and laboratory work on wild animal populations and their diseases. The Bureau, which has a staff of six workers under the direction of Mr. Charles Elton, should perform a useful function in canalising information, and in promoting by its research and its library the understanding of general principles of the fluctuations of hosts and parasites, a subject of which human epidemiology forms an important part.

LYMPHOGRANULOMA INGUINALE

AT the meeting in May, 1934, of the permanent committee of the Office International d'Hygiène Publique in Paris, Carl Kling, representing Sweden, suggested that lymphogranuloma inguinale should be classed with the three main venereal diseases in so far as the benefits of the Brussels Convention of 1924 were concerned. It will be remembered that this convention provided for the free treatment in certain ports of seamen suffering from syphilis, gonorrhœa, and soft sore. Kling's suggestion led to an inquiry into the frequency and behaviour of lymphogranuloma inguinale, and in May, 1935, the outcome of this inquiry was discussed in Paris. While for various reasons the disease was not on this occasion promoted to the benefits of the Brussels Convention, further research was recommended. One of the first fruits of the recommendation was a report made to the Office by Dr. B. Bäfverstedt of Stockholm, and some of his findings are published in *Nordisk medicinsk Tidskrift* for Feb. 20th of this year. It appears that the Swedish health authorities issued circulars in 1934 and 1935 informing the medical profession that lymphogranuloma inguinale would be included among the notifiable diseases till the end of 1937. Though this administrative measure may not have become general knowledge, and though the disease in question is apt to be overlooked and taken for some ailment other than lymphogranuloma inguinale, as many as 236 cases have been diagnosed in Sweden in the decade 1927–36. The bubonic form of the disease was observed in 219 men and in 6 women, while genito-ano-rectal elephantiasis was observed in only 3 men and in 8 women. Since the inclusion of lymphogranuloma among the notifiable diseases, the annual number of notifications has been about 20 to 25. The experience of two important Swedish hospitals is that for every two cases of soft sore there is one of lymphogranuloma requiring hospital treatment. This takes about eight weeks on the average and consists of incision or extirpation of the lymphatic glands, the intravenous injection of metallic salts, and vaccination with Frei's antigen. Radiological treatment has been attempted in some cases as well as treatment with artificial malaria. With regard to operative treatment, Bäfverstedt considers that the fear of post-operative elephantiasis is much exaggerated, and he knows of no such case in Sweden.

SECOND ATTACKS OF INFECTIVE DISEASE

IT has long been a subject of speculation why certain infective diseases confer a more or less lasting immunity while others appear to give no immunity at all, indeed, in some cases, appear to dispose to further attacks. To a limited extent we have found explanations for these vagaries in immunity. In diphtheria, for example, we know that the insusceptibility conferred by an attack is associated with the development and persistence of antitoxin in the blood, and that if the antitoxin falls below a certain level the chance that susceptibility will return becomes proportionately greater. The same explanation holds for scarlet fever, but here there are elements in addition to those that can be ascribed to a toxin; if scarlet fever in its complete clinical form rarely attacks the same person twice, there is reason to suppose that he may still suffer from further attacks of disease due to essentially the same microbic cause. There are diseases such as erysipelas, pneumonia, and the common cold where, at times at least, it appears that one attack only makes a later attack more likely. There are others such as typhoid, measles, and yellow fever where one attack almost always confers a lasting immunity. There are, again, diseases such as tuberculosis where an immunity can be experimentally demonstrated which is difficult to assess under the conditions of ordinary life. In spite of its many triumphs humoral immunity has failed to give us any final explanation as to the essential conditions of insusceptibility for most infective diseases. The decisive factor may be, and probably often is, a function of the cells or tissues, but we know very little as to the differences in behaviour between normal and immune cells and that little has shed less than the expected light on the actual problems of medicine. In a paper recently read before the Ipswich Medical Society, Dr. Herbert H. Brown discussed the possibility that those infections associated with a mononuclear (reticulo-endothelial) response are followed by a lasting immunity, while those associated with a polymorphonuclear response are followed by little

or no immunity. In support he quotes typhoid fever, cholera, variola, and vaccinia as examples of diseases with a mononuclear response; pyogenic infections, herpes simplex, and the common cold as examples of those with a polymorphonuclear response. That the facts of disease are in general agreement with Dr. Brown's thesis cannot be denied and must have occurred to many observers of infections, but there are difficulties in accepting the explanation in toto. The toxigenic diseases such as diphtheria or tetanus are included by Dr. Brown in the reticulo-endothelial response group and he accepts the view, supported to some extent by recent experimental work, that this system is the main place for the elaboration of antibodies. The exact part taken by the reticulo-endothelial system in the formation of antibodies is, however, still too uncertain to bear the weight of any secondary hypothesis. Tuberculosis, syphilis, and the protozoal diseases do not readily fit into the scheme. We question whether the common cold can be correctly termed a disease with a polymorphonuclear response. In the present state of knowledge it would be unsafe to build too much on this apparent correlation between immunity and cellular response. Some day we may find a rational explanation for it.

LONDON WATER ON VIEW

INCREASING attention is being given to the effect of the micro-flora and fauna of water, other than bacteria, on the use of water for domestic and other supplies. Although many workers, including Leeuwenhoek, Ehrenberg, and Savile Kent, have described and classified the diatoms and other algæ, the infusoria, and the animalcules which live in water, their ecology has, especially perhaps in this country, received little attention. It is now being realised how much they prejudice the water-supply: whether by their growth in supply pipes which increases surface friction and decreases delivery capacity or by producing those tastes and odours which, apart from actual harm, irritate and disgust consumers. Some years ago the British Museum (Natural History) staged in the central hall at South Kensington an exhibit, arranged by R. Kirkpatrick, in which amongst other things were shown the fresh-water mussels which in the larval stage had passed through filter beds to reach maturity in the pipes. A more comprehensive exhibit has now been set up in collaboration with the Metropolitan Water Board. The pipe fauna includes sponges and polyzoa (which as they grow harbour other creatures), molluscs, hydroids, eels, and leeches. The uncovered cistern forms a miniature lake in which the resting forms of organisms floating in the air may settle and grow. Although rivers are nearly free from small organisms, the reservoirs in which river water is stored form good growing grounds for them, and in fact develop typical lacustrine populations. Iron bacteria have at times given cause for anxiety. The growth in reservoirs of organisms which live but do not flourish well in rivers is illustrated by a series of photomicrographs, taken at fortnightly intervals, of the plankton of a reservoir, showing the development of stephanodiscus, a diatom, which increased from Dec. 29th, when very few were present, to a maximum on Feb. 9th, when the numbers were enormous, whilst by March 22nd the numbers had fallen to the same order as in December. The control of algæ by coagulants and by algicides is illustrated and a series of graphs shows the successive diminution in numbers of coliform bacilli in raw river water, stored water, water after primary filtration, secondary filtration, and treatment with chloramine. The minima in all cases occurred in July. The exhibit is very lucidly set out and may be commended to lecturers on public health subjects as likely to give their pupils as much instruction in half an hour as could be assimilated in several formal lectures.

THE PREVENTION OF POST-ANÆSTHETIC LIVER DAMAGE

THE evil effect of some anæsthetics upon the parenchyma of the liver has long been known, and "delayed poisoning" from chloroform is regarded as the classic example. Experimentally, ether by very prolonged administration and Avertin have also been shown to produce necrotic changes in the liver cells. It has never been suggested, however, on clinical grounds that there is any association of these injurious effects with oxygen shortage, and the only preventive and remedial measures have been confined to giving a high carbohydrate diet beforehand and glucose by mouth, rectum, or vein after operation. Recent experimental work by Goldschmidt, Ravdin, and Lucké [1] shows that, at any rate in the dog, mixing certain anæsthetics with pure oxygen instead of air has a great influence in preventing damage that would otherwise occur, the oxygen having a definite protective action. They administered chloroform to dogs for an hour, some having air and the others oxygen, and killed them four days later, when they found considerable differences between the two groups. The livers of those dogs that had inhaled oxygen were abnormal in only 32 per cent., while with air there was necrosis in 73 per cent., this being extreme in 10 per cent. Similar results were obtained with divinyl ether. They went on to investigate the question whether anoxæmia of itself, without any anæsthetic, could be responsible for similar effects, and they proved that it could. Dogs submitted to an atmosphere of 15 per cent. oxygen and 85 per cent. nitrogen for two hours, and subsequently examined post mortem, showed degenerative liver changes in 28 per cent. These experiments seem to be important in giving scientific support to the already common practice of adding pure oxygen to inhaled anæsthetics. If what is true of the dog holds good in man this oxygen inhalation will be as effective in preventing liver damage as the usual several days' preoperative administration of a high carbohydrate diet.

[1] *J. Pharmacol.* January, 1937, p. 1.

ASSOCIATION OF INDUSTRIAL MEDICAL OFFICERS.—At a quarterly meeting of this association held in the London School of Hygiene, Keppel-street, on March 12th, Dr. L. P. Lockhart being in the chair, a discussion on Accident Proneness was opened by Mr. Eric Farmer, reader in industrial psychology, Cambridge University. He briefly summarised the investigations which he and other workers had carried out on accident proneness and put forward certain suggestions for future coöperative work between the Industrial Health Research Board and industry, if practicable through the industrial medical officer.—Dr. F. H. C. Beards (I.C.I. Billingham) read a paper on the Organised Treatment and Rehabilitation of the Injured Workman. He outlined the progress of the patient from the time of injury to the time of resuming work and the difficulties of the present procedure in rehabilitation, making suggestions for improvement. He divided accidents into minor and major cases, remarking that in importance they were equal. He would like to see the provision of alternative work schemes in industry; this could best be done, he thought, by coöperative effort of industrial medical officer and works management. Only the larger firms could afford to employ whole- or part-time medical officers, but he felt that much more could be done to help the smaller concerns.

PRINCIPLES OF MEDICAL STATISTICS

XII—COMMON FALLACIES AND DIFFICULTIES

In the following sections I have set out examples of the misuse of statistics. In some of them the actual figures have been taken from published papers; in others hypothetical figures have been used to indicate the type of error which has led the worker to fallacious conclusions. No principles are involved that have not been discussed in the previous sections. The object is merely to illustrate, at the risk of "damnable reiteration," the importance of these principles by means of simple numerical examples (in some instances—e.g., (*a*) below—the figures are deliberately exaggerated to make clearer the point at issue). The fact that in practice such grossly exaggerated differences rarely occur does not lessen the importance of accurate statistical treatment of data. Differences do occur very often of a magnitude to lead to erroneous conclusions, if the data are incompetently handled in the ways set out.

Mixing of Non-comparable Records

(*a*) Let us suppose that in a particular disease the fatality-rate is twice as high amongst females as it is amongst males, and that amongst male patients it is 20 per cent. and amongst female patients 40 per cent. A new form of treatment is adopted and applied to 80 males and 40 females; 30 males and 60 females are observed as controls. The number of deaths observed amongst the 120 *individuals* given the new treatment is 32, giving a fatality-rate of 26·7 per cent., while the number of deaths observed amongst the 90 *individuals* taken as controls is 30, giving a fatality-rate of 33·3 per cent. Superficially this comparison suggests that the new treatment is of some value; in fact that conclusion is wholly unjustified, for we are not comparing like with like. The fatality-rates of the total number of individuals must be influenced by the proportions of the two sexes present in each sample; males and females, in fact, are not equally represented in the sample treated and in the sample taken as control. Tabulating the figures shows the fallacy clearly (Table XIV).

TABLE XIV

—	Males.	Females.	Males and females combined.
Normal fatality-rate ..	20 %	40 %	—
Number of patients given new treatment	80	40	120
Deaths observed in treated group	16	16	32
Fatality-rates observed in treated group	20 %	40 %	26·7 %
Number of patients used as controls	30	60	90
Deaths observed in control group	6	24	30
Fatality-rates observed in control group	20 %	40 %	33 %

The comparison of like with like—i.e., males with males and females with females—shows that the treatment was of no value since the fatality-rates of the treated and untreated sex groups are identical, and equal to the normal rates. Comparison of the total samples, regardless of sex, is inadmissible for the fatality-rate recorded is then in part dependent upon the proportion of the two sexes that are present. There are proportionately more females amongst the controls than in the treated group, and since females normally have a higher fatality-rate than males their presence in the control group in relatively greater numbers must lead to a comparatively high fatality-rate in the total sample. Equally their relative deficiency in the treated group leads to a comparatively low fatality-rate in that total sample. No comparison is valid which does not allow for the sex differentiation of the fatality-rates.

An actual example of this error is in the record of a less favourable reaction of females to forms of treatment for syphilis. It should not be forgotten that when two such forms of treatment are being compared, sex differentiation, in assessing the results (or sex equality in the two groups), may be of importance.

(*b*) One more example of the result of mixing non-comparable records may be given. The following (hypothetical) figures show the attack-rates of a disease upon an inoculated and an uninoculated population (Table XV).

TABLE XV

Year.	Number of persons.		Number of persons attacked.		Attack-rates per cent.	
	Inoc.	Uninoc.	Inoc.	Uninoc.	Inoc.	Uninoc.
1935 ..	100	1000	10	100	10	10
1936 ..	500	600	5	6	1	1
1935 and 1936	600	1600	15	106	2·5	6·6

In each calendar year the attack-rate of the inoculated is equal to the attack-rate of the uninoculated. Between 1935 and 1936 there has, however, been a large change in the size of the inoculated and uninoculated population and also a large change in the level of the attack-rate. Summation of the results for the two years leads to the fallacious conclusion that the inoculation afforded some protection. The large uninoculated population in 1935 when the attack-rate was high leads to an absolutely large number of cases—though in relation to their numbers the uninoculated are at no disadvantage compared with the inoculated. The inoculated cannot contribute an equal number of cases for the population at risk in that year (1935) is far smaller. Thus amalgamation of the unequal numbers of persons exposed to

TABLE XVI

Year.	Number of persons.		Number of persons attacked.		Attack-rates per cent.	
	Inoc.	Uninoc.	Inoc.	Uninoc.	Inoc.	Uninoc.
1935 ..	100	1000	10	100	10	10
1936 ..	500	600	50	60	10	10
1935 and 1936	600	1600	60	160	10	10
1935 ..	500	600	50	60	10	10
1936 ..	500	600	5	6	1	1
1935 and 1936	1000	1200	55	66	5·5	5·5

different risks in the two years is unjustified. No fallacy would have resulted if the attack-rate had not changed or if the proportions exposed to risk had not changed, as the above figures show (Table XVI).

When the populations at risk and the attack-rates *both* vary, the calendar year becomes a relevant factor, and must be taken into account by the calculation of rates within the year.

Such a problem does arise quite frequently in practice, for example in assessing the incidence of diphtheria on immunised and unimmunised children. The numbers in the immunised group vary from year to year and the incidence of diphtheria also varies. Summation of the experience over a series of years may lead to an erroneous conclusion of the type illustrated.

Neglect of the Period of Exposure to Risk

(*a*) A further fallacy in the comparison of the experiences of inoculated and uninoculated persons lies in neglect of the time during which the individuals are exposed first in one group and then in the other. Suppose that in the area considered there were on Jan. 1st, 1936, 300 inoculated persons and 1000 uninoculated persons. The number of attacks are observed within these two groups over the calendar year and the annual attack-rates are compared. This is a valid comparison *so long as the two groups were subject during the calendar year to no additions or withdrawals.* But if, as often occurs in practice, persons are being inoculated *during* the year of observation the comparison becomes invalid unless the point of time at which they enter the inoculated group is taken into account.

Suppose on Jan. 1st, 1936, there are 5000 persons under observation, none of whom are inoculated; that 300 are inoculated on April 1st, a further 600 on July 1st, and another 100 on Oct. 1st. At the end of the year there are, therefore, 1000 inoculated persons and 4000 still uninoculated. During the year there were registered 110 attacks amongst the inoculated persons and 890 amongst the uninoculated. If the ratio of recorded attacks to the population *at the end of the year* is taken, then we have rates of 110/1000=11·0 per cent. amongst the inoculated and 890/4000=22·3 per cent. amongst the uninoculated, a result apparently very favourable to inoculation. This result, however, *must* be reached even if inoculation is completely valueless, for no account has been taken of the unequal lengths of time over which the two groups were exposed. None of the 1000 persons in the inoculated group were exposed to risk for the *whole* of the year but only for some fraction of it; for a proportion of the year they belong to the uninoculated group and must be counted in that group for an appropriate length of time.

The calculation should be as follows:

All 5000 persons were uninoculated during the first quarter of the year and therefore contribute $(5000\times\frac{1}{4})$ years of exposure to that group. During the second quarter 4700 persons belonged to this group—i.e., 5000 less the 300 who were inoculated on April 1st—and they contribute $(4700\times\frac{1}{4})$ years of exposure to the uninoculated group. During the third quarter 4100 persons belonged to this group—i.e., 4700 less the 600 who were inoculated on July 1st—and they contribute $(4100\times\frac{1}{4})$ years of exposure. Finally in the last quarter of the year there were 4000 uninoculated persons—i.e., 4100 less the 100 inoculated on Oct. 1st—and they contribute $(4000\times\frac{1}{4})$ years of exposure. The "person-years" of exposure in the uninoculated group were therefore $(5000\times\frac{1}{4}) + (4700\times\frac{1}{4}) + (4100\times\frac{1}{4}) + (4000\times\frac{1}{4}) = 4450$, and the attack-rate was 890/4450=20 per cent.—i.e., the equivalent of 20 attacks per 100 persons per annum. Similarly the person-years of exposure in the inoculated group are $(0\times\frac{1}{4}) + (300\times\frac{1}{4}) + (900\times\frac{1}{4}) + (1000\times\frac{1}{4}) = 550$, for there were no persons in this group during the first three months of the year, 300 persons during the second quarter of the year, 900 during the third quarter, and 1000 during the last quarter. The attack-rate was, therefore, 110/550 = 20 per cent., and the inoculated and uninoculated have identical attack-rates. Neglect of the durations of exposure to risk must lead to fallacious results and must favour the inoculated. The figures are given in tabulated form (Table XVII).

TABLE XVII

Inoculated at each point of time.	Inoculated.		Uninoculated.	
	Exposed to risk in each quarter of the year.	Attacks at 5 per cent. per quarter.	Exposed to risk in each quarter of the year.	Attacks at 5 per cent. per quarter.
Jan. 1st, 0	0	0	5000	250
Apr. 1st, 300	300	15	4700	235
July 1st, 600	900	45	4100	205
Oct. 1st, 100	1000	50	4000	200
Total at end of the year ..	1000	110	4000	890

Fallacious comparison.—Ratio of attacks to final population of group. Inoculated 110/1000=11·0 per cent. Uninoculated 890/4000=22·3 per cent.

True comparison.—Ratio of attacks to person-years of exposure. Inoculated $110/(300\times\frac{1}{4}) + (900\times\frac{1}{4}) + (1000\times\frac{1}{4}) = 20$ per cent. Uninoculated $890/(5000\times\frac{1}{4}) + (4700\times\frac{1}{4}) + (4100\times\frac{1}{4}) + (4000\times\frac{1}{4}) = 20$ per cent.

This example is an exaggerated form of what may (and does) happen in practice if the time-factor is ignored. Clearly even if the time-factor is allowed for, interpretation of the results must be made with care. If the inoculated show an advantage over the uninoculated it must be considered whether at the point of time they entered that group the incidence of the disease was already declining, due merely to the epidemic swing. But that is another point.

(*b*) A cruder neglect of the time-factor sometimes appears in print, and may be illustrated as follows. In 1930 a new form of treatment is introduced and applied to patients seen between 1930 and 1935. The proportion of patients still alive at the end of 1935 is calculated. This figure is compared with the proportion of patients still alive at the end of 1935 who were treated in 1925–29, prior to the introduction of the new treatment. Such a comparison is, of course, inadmissible. The patients seen in 1925–29 have by the end of 1935 had 6 to 11 years in which to succumb, with an average exposure of 8½ years if their attendances were equally spread over 1925–29. The patients seen in 1930–35 have had only 0 to 6 years in which to succumb, with an average exposure of 3 years if there attendances were equally spread over 1930–35. To be valid the comparison must be between the survival-rates at equal stages of time, 1, 2, 3 years, &c., after treatment.

Absence of Exposed to Risk or Standard of Comparison

It often happens that an investigation is confined to individuals marked by some characteristic.

(*a*) For example a detailed inquiry is made into the home conditions of each infant dying in the first year of life in a certain area over a selected period of time, and it is found that 15 per cent. of these infants lived under unsatisfactory housing conditions. Do such conditions, or factors associated with them, lead to a high rate of infant mortality? The limitation of the inquiry to the dead makes it quite impossible to answer this

question. We need information as to the proportion of *all* infants who were born in that area over that period of observation who live under unsatisfactory housing conditions. If 15 per cent. of *all* infants live under such conditions, then 15 per cent. of the deaths may reasonably be expected from those houses and unsatisfactory housing appears unimportant. If on the other hand only 5 per cent. of *all* infants are found in these conditions but 15 per cent. of the deaths come from such houses, there is evidence of an excess of mortality under the adverse conditions. In practice it may be impossible for financial or administrative reasons to investigate the home conditions of all infants. It should be possible, however, to inquire into a random sample of them, say every tenth birth registered in the area over a given period of time. Without some such standard of comparison no clear answer can be reached. Such limited investigations have been made into the problems of both infant and maternal mortality.

(*b*) After very careful inquiry it is shown that of motor-car drivers involved in accidents a certain proportion, say three-quarters, had consumed alcohol during some period of hours previous to the accidents, and one-quarter had not. The deduction that alcohol contributes to the risk of accident is not justified from these figures alone. It is well recognised that white sheep eat more than black sheep —because there are more of them. Before the ratio of 3 "alcoholics" to 1 "non-alcoholic" amongst the accident cases can be interpreted, information is also required as to the comparable ratio amongst drivers *not involved in accidents*. Suppose, for example, there are 1000 drivers on the roads, and 48 accidents are recorded. Of the 48 drivers involved in these accidents three-quarters are found to have consumed alcohol—i.e., 36—and one-quarter—i.e., 12—have not. If three-quarters of *all* the 1000 drivers have consumed alcohol within a few hours of driving and one-quarter have not, then the populations "exposed to risk" of accident are 750 and 250. The accident-rates are, then, identical—namely, 36 in 750 and 12 in 250, or 4·8 per cent. in each group. A knowledge of the exposed to risk, or of the ratio of alcohol consumers to non-consumers in a random sample of all drivers, is essential before conclusions can be drawn from the ratio in the accident cases.

Careful inquiry into the destination of drivers involved in accidents on a Sunday morning might show that a larger proportion was driving to golf than to church. The inference that driving to golf is a more hazardous occupation is not valid until we are satisfied that there are not, in this case, more black sheep than white sheep.[1]

Association, Direct or Indirect

It has been observed that while the death-rate from cancer has been rising the sale of bananas in England and Wales has also been increasing. No one (so far as I know) has deduced from this relationship in time a relationship of cause and effect. But such a deduction would be no less logical than many that are drawn from time relationships—e.g., the relationship of the cancer death-rate to a hundred-and-one aspects of "modern" life.

More often the time relationship is used as further evidence of a cause and effect expected on the grounds of quite other evidence—e.g., experimental results.

(*a*) For instance, the effect of bacteriophage is measured by comparing the incidence of cholera in two areas, one in which bacteriophage was distributed, the other serving as a standard of comparison. In the former the incidence is found over an observed period of time to be at a lower level than the incidence in previous years or in the area observed as a control (the question of duration of exposure to risk, dealt with above, having been properly observed). It is clear that there is an association both in time and space between the incidence of cholera and the administration of bacteriophage. Is that association one of cause and effect? The answer must be that the results are perfectly *consistent* with that hypothesis, but that consistency is not the equivalent of proof. The incidence of epidemic disease fluctuates both in time and space for unknown reasons, and the abnormally low attack-rates in the area in which bacteriophage was administered *may* be the result of the influence of those undetermined natural causes operating at the same time as the experiment was carried out. Repetition of the experiment in another area with equivalent results would strengthen the hypothesis that bacteriophage was beneficial. With observations of this kind, limited in time and space, it is well to reflect upon the fact that "if when the tide is falling you take out water with a twopenny pail, you and the moon together can do a great deal." The history of scarlet fever may well be remembered, in this connexion, as illustrated by the testimony of R. J. Graves ("A System of Clinical Medicine," Dublin, 1843). In the first few years of the nineteenth century the disease "committed great ravages in Dublin" and was "extremely fatal." After the year 1804 it assumed a "very benign type" and was "seldom attended with danger until the year 1831." In 1834 it again took the form of a "destructive epidemic." The low fatality after 1804 was "every day quoted as exhibiting one of the most triumphant examples of the efficacy" of new methods of treatment. But Graves candidly admits that "the experience derived from the present [1834–35] epidemic has completely refuted this reasoning, and has proved that, in spite of our boasted improvements, we have not been more successful in 1834–5 than were our predecessors in 1801–2" (quoted from Charles Creighton's "History of Epidemics in Britain," Camb. Univ. Press, 1894, Vol. II, pp. 722–25).

(*b*) During an epidemic individuals are, *at their own request*, inoculated, and are found to suffer a lower attack-rate than that of the uninoculated. This result is clearly consistent with the hypothesis that the inoculation was beneficial. On the other hand, the association may be an indirect one. Presuming that the inoculated and uninoculated groups were equal in such characteristics as age, sex, and duration of exposure to risk, it is possible that they were differentiated in other relevant ways. Those who voluntarily come forward for inoculation may consist of individuals who also take other precautionary measures to avoid infection—e.g., the avoidance of theatres and cinemas during the epidemic period. They may belong to a class higher in the social scale and be less exposed to the risk of infection thereby—e.g., by living in less crowded conditions or by being better nourished. In comparing the inoculated with the uninoculated we must always consider closely whether we are in fact comparing like with like—except in the one respect of inoculation.

A. B. H

[1] Lest it should be thought that undue stress is being laid upon the obvious, the following quotation from a debate in the House of Lords may be of interest. A noble Lord is reported (*Times*, Feb. 7th, 1936) to have said that "only 4 per cent. of the drivers involved in fatal accidents were women, and that was because they drove more slowly." Without evidence of the hours of driving endured (perhaps a fitting word nowadays) by each sex—and perhaps of the type of area—that conclusion cannot be justified.

SPECIAL ARTICLES

MEDICAL RESEARCH COUNCIL

ANNUAL REPORT 1935–36

THE report of the Medical Research Council for 1935–36[1] begins on a note of welcome to Lord Balfour of Burleigh as the new chairman, succeeding Lord Linlithgow, and of congratulation to Sir Henry Dale, F.R.S., director of the National Institute for Medical Research, on the award of the Nobel prize for medicine jointly with Prof. Otto Loewi of Graz.

This award recognises their work on the nature of the chemical mechanism involved in the transmission of nerve impulses. Sir Henry Dale and his co-workers showed that acetylcholine is the chemical transmitter not only of the vagal impulse to the heart muscle but of other parasympathetic nerve activities, and also of some sympathetic actions. They have now established that acetylcholine is also the medium through which motor nerve impulses activate voluntary muscle; probably, indeed, the transmission of the effects of most efferent impulses throughout the peripheral nervous system is dependent at some stage or other on this chemical action.

The physiological and clinical implications of this brilliant work are not yet explored. Already, however, it has provided a scientific basis for Dr. Mary Walker's discovery that prostigmin alleviates cases of myasthenia gravis; and there are indications that some compounds closely allied to acetylcholine, but more stable, may have therapeutic value.

It is customary for the council to select for comment in an introductory survey some dozen from the various schemes of research in progress. This year increased space has been allocated to this survey, which deals with clinical research; influenza; nutrition; the prevention and treatment of childbed fever; deafness; the experimental study of epidemics; cotton-dust "asthma"; tuberculosis: treatment by artificial pneumothorax; and medical research in the tropics.

Clinical Research

Lord Nuffield's gift to Oxford is welcomed as being fully in accord with the policy of the council, particularly in its establishment of senior clinical posts on a nearly whole-time basis. Reference is made to the handicapping effect on research in clinical medicine and surgery of the claims of private professional practice and to the tendency for promising clinical investigators either to become increasingly absorbed by their patients or to transfer their interests to research in other fields. The increase in the number of substantially whole-time clinical posts, candidates for which are expected to have had experience in research, makes the opportunities at Oxford, and on a smaller scale at Cambridge under the direction of Prof. J. A. Ryle, of special importance. The council's contribution to the training of investigators in clinical science and experimental pathology during the year under review has been the establishment of six postgraduate studentships and four research fellowships.

Influenza

The investigations on influenza at the National Institute for Medical Research by Sir Patrick Laidlaw, F.R.S., Dr. C. H. Andrewes, Dr. Wilson Smith, and Dr. Stuart-Harris (holding a Royce fellowship) have made substantial progress. Attention is here drawn to three aspects of it.

(1) *World-wide diffusion of the virus originally isolated and identified at the Institute.*[2]—Filtered nasal washings from patients suffering from typical influenza in widely distant parts of the world (as England, Porto Rico, Philadelphia, Alaska, Australia, Holland, European Russia) when inoculated into ferrets causes the appearance of the same virus in their respiratory passages; this virus will then infect other ferrets and can be transmitted to mice. This evidence suggests strongly that the virus thus propagated in the ferret is the primary infective agent of epidemic influenza in man.

(2) *Transmission of ferret influenza to man.*—The accidental infection of one of the team of workers from a ferret, and the subsequent demonstration of antibodies in his blood-serum, which had previously been negative, provided the important link completing the chain of evidence for the identity of the virus maintained and studied for over two years in ferrets, as the cause of human influenza; it also provided additional evidence of a connexion between the virus-neutralising antibody in the blood-serum and resistance to infection. Negative evidence pointing in the same direction has been obtained by Dr. Stuart-Harris, who found that blood-sera of inhabitants of St. Helena, which escaped the pandemic of influenza in 1918, had no neutralising antibody for the virus. These islanders have since suffered from an epidemic disease resembling influenza, and samples of sera from persons affected are being examined.

(3) *Possibility of immunising man against influenza.*—Substantial progress has been made by Dr. Andrewes and Dr. Smith towards the production, from the virus, of a vaccine potent and pure enough to be worth testing for its value in immunising the human subject. A virus of such potency has been obtained that the filtrate from the lungs of infected mice is able to infect a mouse in a dilution of one in ten million; and this virus can be made completely non-infective, without appreciable loss of antigenic value, by treatment with very weak formaldehyde. The virus in the living state is apparently innocuous when given by hypodermic injection, and is being used in that way for immunisation trials in the United States.

A vaccine purified by ultrafiltration has been found, in the mouse, to confer a substantial degree of resistance to infection by the respiratory passages, and trials of its immunising effect on man are in progress.

It would be premature to attempt to estimate the probability of practical success with such methods. Though a virus extracted from the infected mouse lung, or from a culture on chicken embryo, will newly evoke the specific neutralising antibody in the blood of a human subject, or produce an increase of this antibody if it is already present, it remains uncertain whether the amount of circulating antibody thus produced will confer a significant degree of resistance to naturally acquired infection, or if it does, how long such resistance would last. But there is ample justification for hope.

Nutrition

The relative importance of nutrition and exercise in the promotion of bodily and mental fitness is discussed; physical development and health are primarily dependent on proper feeding, and exercises, whether as games or drill, are subsidiary to this, and their full benefits can be obtained only in those whose bodily and mental qualities have been developed to their innate maximum by proper feeding.

Among the investigations of nutritional factors supported by the council, those deemed worthy of special remark are the studies by Prof. E. P. Cathcart and Mrs. A. T. M. Murray of the ordinary diet of families in various

[1] Report of the Medical Research Council for the year 1935–36. London: H.M. Stationery Office. 1937. Pp. 172. 3s.

[2] *Lancet*, 1933, **2**, 66.

towns, notably in St. Andrews, Cardiff, Reading, and Glasgow. Though the types of foodstuffs eaten varied within wide limits the distribution of calories between protein, fat, and carbohydrate eaten by people in different towns was found to be remarkably constant.

According to these workers the daily diet of 109 women students (average age 21), whose general physique and health was reported to be very good, contained 2035 calories per person.

Doubt is expressed whether much misplaced trust is not being put on the 3000 calorie intake as a standard figure. The council point out that the Technical Commission on Nutrition, appointed by the Health Section of the League of Nations, decided that a daily allowance of 2400 calories net is adequate to meet the energy requirements of an adult, male or female, living an ordinary everyday life in a temperate climate and not engaged in manual work.

Steps designed to improve the physical fitness of the community must take account of both the educational and economic aspects of this problem. Even if there were abundant money for food expenditure in every household, ignorance and stupidity would often prevent the maximum nutritional benefits from being obtained; but the limiting factor in a large section of the community remains the food-purchasing power.

Dr. R. A. McCance has analysed, for some fifteen different constituents, the chemical composition of some British foods, and the losses which they undergo during cooking: 87 kinds of fish, 45 cuts of meat, 12 different birds, 65 fruits, and 67 vegetables were studied, without ignoring the limitations of direct chemical analysis of food as a guide to its nutritional value. Many accepted theories about cooking were not supported by the experimental evidence—e.g., it makes no difference to the losses whether meat is plunged into boiling water at the start or placed in cold water and slowly brought to the boil; and although vegetables lose nutrients rapidly when they are cooked in water, they may be soaked and washed in cold water in the raw state without loss.

Since diets can seldom be weighed or measured until after they have been prepared and cooked, the value of having reliable figures for the chemical composition of cooked foods should be appreciated not only by physicians but by those in charge of the dietetic departments of hospitals.

Influence of Diet on Decay of Children's Teeth

The council observes that the theory advanced by Mrs. M. Mellanby on dental decay—that a dominant factor in determining the structure of the teeth and their resistance to decay is the nutritional condition of the body, and more particularly the supply of specific food elements provided to the teeth in early life—is based on experimental and clinical evidence which has been generally accepted by scientific workers; but it has met with criticism and even denial from some dentists. It is almost impossible in a field experiment with children to secure controlled conditions in which all factors can be stabilised except the one under test, especially when this is a biological agent applied over a long period. However, the results of a trial over a restricted period and subject to inevitable limitations which was undertaken at Birmingham on children living in institutions support convincingly the previous findings of Mrs. Mellanby. They are in agreement with her view, so far as vitamin D is concerned, that the teeth—like other organs of the body—are strongly influenced by nutritional factors brought to bear upon them, either through their blood-supply or indirectly through the saliva. The dental decay that developed in the children receiving vitamin D was definitely less than in the control children not receiving the additional amount of this substance.

In one other important respect confirmation of earlier work by this report is deemed worthy of mention. The less obvious forms of imperfect dental structure (hypoplasia), described by Mrs. Mellanby in 1923 as not only widespread among children in this country but also directly related to liability to decay, were seen to be present in a large proportion of these children, whereas gross defects of structure (the "hypoplasia" of the text-books) were comparatively rare. A direct relationship between the structure of the teeth and decay was also found.

These sample tests of Mrs. Mellanby's thesis support the view that the most promising method, according to present knowledge, of improving the dental condition of this country is to increase consumption of milk and other dairy and market-gardening produce which benefit dental structure and resistance, and especially in the earlier years of life to reduce the consumption of bread and other cereals which either actively or passively result in the developmnt of defective teeth. By this means it may be expected at least that the teeth of the next generation will be greatly improved.

Prevention and Treatment of Childbed Fever

After Dr. Dora Colebrook's demonstration that hæmolytic streptococci, the micro-organisms responsible for puerperal sepsis, are not present in the birth canal of normal women, but are conveyed thereto from the respiratory tract or skin of medical attendants, or of friends, or of the patients themselves, came the cheering news of the remarkable success apparently achieved at Queen Charlotte's Hospital by Dr. Leonard Colebrook and his colleagues in combating this infection even when it is well established. They used the German dye Red Prontosil and Prontosil Soluble, and are now making clinical tests of the colourless substance para-aminobenzene-sulphonamide, which is allied in composition to red prontosil, since experiments in progress suggest that it gives even better results.[1] During the years 1931 to 1935, 495 cases of puerperal sepsis entered Queen Charlotte's Hospital, and of these 112 died, giving a fatality of 22·7 per cent. In part of the year 1936, 64 cases of puerperal sepsis were treated by red prontosil and prontosil soluble in the same hospital; of these cases only 3 have died, giving a fatality of 4·7 per cent. Moreover, there has been a sudden reduction in the severity of peritonitis associated with puerperal sepsis in cases treated with prontosil, and none of these patients developed a palpable pelvic or abdomino-pelvic inflammatory mass or abscess after the beginning of treatment, although this is ordinarily one of the commonest complications of puerperal infections by hæmolytic streptococci. If caution is still necessary in claiming success for this treatment it is because of the signs of a general diminution in the severity of puerperal sepsis in this country during the past five years; but a change in fatality-rate from 22·7 to 4·7 per cent. is at least strongly suggestive of the value of these new drugs, quite apart from the published records of surprising recoveries in individual cases. Reliance on curative drugs must in any case be the third line of defence in the fight against puerperal sepsis. The first line must be the conduct of childbirth in such a way as to prevent (*a*) access of pathogenic organisms, especially streptococci associated with sore-throat, to the birth canal of women, and (*b*) transport of these organisms from

[1] See *Lancet*, 1936, **2**, 1319 and 1323.

the skin and other parts of the body. Secondly, the resistance of pregnant women should be raised to the highest possible level by an ample supply of milk, green vegetable, and other protective foods.

Deafness

The aspects of deafness which have been studied are: (1) the actual range of defect in hearing, as regards frequency and amplitude of sound in individual people, and the amount of improvement that can be produced by mechanical means on the basis of this detailed knowledge; (2) the degree to which deafness gives the clue to apparent mental retardation; (3) prevention of acquired deafness.

Dr. and Mrs. A. W. G. Ewing and Dr. T. S. Littler have found that the results obtained by testing patients for a series of pure tones by means of the audiometer provide a reliable index of the intelligibility of speech to the deaf listener, and, in teaching, that the class amplifier has a number of definite advantages over individual aids.

Dr. Phyllis Kerridge has concluded from the results of careful study that nearly all "partially deaf" children would benefit greatly by hearing-aids; whereas among the deaf children—i.e., those who cannot hear the conversational voice as far as two feet away—more than half would derive considerable benefit from sound-magnification instruments.

As to prevention, the reports by Dr. T. E. Banks and Dr. Parkes of a lower incidence of inflammation of the middle ear and other sequelæ of scarlet fever and measles following the use of sera in London County Council hospitals are noted with satisfaction, and the extension of such forms of treatment in these and other directions is anticipated.

Experimental Study of Epidemics

There have been many productive clinical investigations into epidemic diseases but certain fundamental problems of epidemiology have resisted field investigation. On the other hand a close experimental study of animals in a herd exposed to infection has already answered certain questions relative to human epidemics, and may be expected to answer more in the future. For the last 18 years a team now working at the London School of Hygiene and Tropical Medicine have exposed large numbers of mice to different infective agents and have studied their mortality-rates and possible methods of altering these rates.

It appears that in large herds or groups living under conditions favourable to the spread of epidemic disease, and receiving regular additions of healthy animals, the disease will persist indefinitely. It also appears that, under such conditions, the form of the mortality curve and the size of the herd is determined in the main by the rate of immigration. In certain epidemics the rate of mortality during the early days of herd life is very high, approximately half the entrants being dead after 25 days, and three-quarters to four-fifths after 50 days. Between the 40th and 60th days of cage life, the mortality-rate reaches a low level. The expectation of life from the 20th to the 30th day rises continuously, but never reaches the expectation of normal mice living in the same environment but not in contact with an infective disease. It is considered that these events show that both selection (by death of the more susceptible) and natural immunisation play a part in the increased average resistance displayed by surviving mice, and that natural immunisation is more important than selection.

As regards possible methods of interfering with the normal course of infected herds, three of these have been studied—artificial immunisation, changes in diet, and bacteriophage. The best results were obtained with artificial immunisation, but a complete immunity was never obtained: the dietary experiments were negative, but recently Dr. Marion Watson, working in association with Prof. W. W. C. Topley, F.R.S., has obtained results which suggest that diet has a powerful influence on the mortality-rates of mice infected artificially with *Bacillus aertrycke*. Similarly, the negative results obtained with bacteriophage are regarded as by no means conclusive. Active immunisation, though it has failed in these experiments to give results as successful as those reported from the field, has significantly increased the expectation of life, particularly in ectromelia epidemics. It seems probable that the experimental method will make it possible to define more clearly the factors that determine the successful exploitation of this method of prophylaxis.

Cotton-Dust "Asthma"

The disabling chest trouble due to the inhalation of cotton dust by certain workers in the cotton industry takes the form of attacks of cough or breathlessness, occurring particularly on Monday morning after the week-end break. Gradually the symptoms spread over the ensuing days of the week and clinical examination of patients with established symptoms reveals the signs of chronic bronchitis and emphysema. The death-rate from bronchitis among male cotton strippers between the ages of 20 and 60 is five and a half times greater than that for all occupied and retired males, and ten times greater than that in such dusty occupations as cement workers and lime burners. Prof. Carl Prausnitz, working in Maitland's department in the University of Manchester, has investigated this problem. He was able to show that although much has been done by mill-owners to reduce the dust in card-rooms, the most dangerous fraction of cotton dust, consisting of the particles under two microns in diameter, still obtains access to the workers' lungs; the protein fraction of this dust contains some toxic factor which is probably responsible for the respiratory trouble. Prof. Prausnitz is not hopeful that desensitisation will improve the condition; and since the present methods of ventilation and exhaust do not entirely exclude these minute particles, the solution probably depends either on the adoption by the workers of suitable respirators, of which a more satisfactory form is being sought, or on the application of new means of preventing the particles from entering the air.

Tuberculosis: Treatment by Artificial Pneumothorax

The fate of patients receiving artificial pneumothorax treatment under the tuberculosis scheme of the London County Council between the years 1920 and 1930 has been reviewed by Dr. F. J. Bentley.

As a result of this study it emerged that those patients in whom complete collapse had been produced had a much higher rate of survival than those whose affected lung was only partially collapsed; also that success is more likely in the early stages of disease and where only one lung is affected. It is interesting that favourable results in both sexes were found in the age-group 25–30, while the age-group 20–25 is peculiar in showing the best result in males and disappointing results in females. Dr. Bentley suggests that the treatment might well be used more extensively in young male adults.

Artificial pneumothorax treatment is of limited application but in properly selected individual sufferers it sensibly increases the expectation of life and working capacity.

Tropical Medicine

The concluding paragraphs of the introduction to this report record the formation and proposed

activities of the new tropical medical research committee. This committee has already made recommendations, on which the council have begun to take action, for the recruitment of able young investigators willing to work in the tropics and for the eventual establishment of permanent posts for research in tropical medicine, to which workers engaged at first on a temporary basis may reasonably aspire.

In addition to launching this main scheme of fellowships and appointments, the council are prepared to assist research in tropical medicine in other ways as opportunity may offer. In particular, grants will be available to enable workers in established positions at home, particularly those not having the facilities already possessed by the staffs of schools of tropical medicine, to make short visits to the tropics for the purposes of research or the collection of material.

AIR-RAID WARDENS

THE Air-Raid Precautions Department of the Home Office issued last week a memorandum explaining the need for an organisation of citizen volunteers to perform a number of important duties in time of air attack, thereby augmenting and relieving the normal resources of the civil authorities and safeguarding the general public. These volunteers, to be entitled Air-Raid Wardens, would work in contiguity to their homes and places of business, their chief duties being to advise their fellow citizens on the precautions against air raids as officially recommended; in time of war they would know how to start relief measures and where to apply for appropriate help.

THE DUTIES OF THE WARDENS

The wardens will require organisation and training and it is proposed that their work would always be done in consultation with the police. It is expressly stated that they would be males, and that no direct responsibility for fire fighting will be laid upon them, as an auxiliary fire service will be formed by the fire brigade.

The qualities and functions of a warden are set out succinctly in the memorandum. He should be a responsible member of the public, well known and respected in his area, and his duty will be to supplement the resources of the police and fire brigade by rapid information as to the details of the fall of bombs, and by giving immediate warning of the suspected presence of gas. It would be his duty to shepherd the public to shelter when an air-raid warning has been received, and to deal with casualties or damage until skilled help arrives. Lastly and most importantly, the wardens are urged to set an example of coolness and steadiness among their neighbours. In each borough or district they should form a service of their own under a chief warden assisted by head wardens acting as group leaders.

The distribution of civilian respirators will be in the hands of the wardens acting in collaboration with the local authorities. It is recognised that the services of a considerable number of trained men intimately acquainted with the particular locality will be required, for in any immediate preparations for war members of existing public services might not be available. Although the war duties of the wardens do not commence until the actual air attacks, the respirators should by that time be already distributed.

THE WARDENS IN TIME OF WAR

It is proposed that the wardens should operate from fixed posts, each man being responsible for a defined group of streets, or "sector," and each post should be manned during a raid by two or three wardens. The duties of the wardens, as set out, may be more particularly summarised thus: To know the organisation in their locality, to advise persons in the street when an air-raid warning has been given, and to report at prescribed places the presence of gas or fires and the falling of bombs in their sector. Other duties are to estimate the extent of damage done and to be ready to report upon it, to assist occupants of damaged buildings to find new shelter; to guide the police, fire brigade, first-aid parties, and rescue parties on arrival upon the scene of damage; to convey messages or render any other assistance required by police or fire brigade officers; and to help householders or the personnel of fire posts to fight incipient fires, pending the arrival of the fire brigade. And to assist in every possible way to prevent panic. The Government will be responsible for equipment, and wardens, after training, will be eligible for the Air-Raid Precautions badge.

ORGANISATION OF AIR-RAID WARDENS

There are many points yet to be determined before the Home Office plans can be regarded as complete, but alternative schemes of organisation are put forward. Every scheme of organisation should provide for a chief warden in executive control, assisted by head wardens in charge of groups of posts. These leaders will be required whether the control of the wardens is placed in the hands of the chief constable or of some other local official. Subject to this general principle, the scheme of organisation of air-raid wardens can take one of several forms, of which the following are the main types:—

SCHEME A

Air-raid wardens may be organised independently of the police, under the control of some local official other than the chief officer of police. They would work under the chief warden, who would be in executive charge of the service in the local air-raid precautions organisation, but responsible to the permanent official deputed to exercise supervision and control. If this scheme is adopted, it is nevertheless recommended that the police should be consulted before the actual enrolment of wardens, to ensure that only suitable men are chosen. This scheme will be adopted in the metropolitan police district because it is felt that the size of the district and the large number of important local authorities which it contains make it preferable to decentralise the air-raid wardens' organisation. It does not follow that it would be the most suitable scheme outside the metropolitan police district. Where this scheme is adopted, it would be possible to employ some existing body or association as the agent for organising and training the air-raid wardens, the chief warden being a responsible official of that body or association.

SCHEME B

An alternative scheme would be for local authorities to arrange the framework of the wardens' organisation, particularly as regards the numbers of wardens required and the location of their posts, on the basis that in time of war they would operate under the control of the chief constable. Each area would have its chief warden, appointed by the local authority or authorities concerned in consultation with the chief constable, and the chief warden would be responsible for the recruitment and training of wardens with such assistance from the police as might be arranged. This scheme is of a hybrid character, but it is not considered that there need be any difficulty in its working smoothly, provided that close coöperation was maintained with the chief constable from the outset;

and it might be suitable for parts of county police districts. It would be possible here to utilise existing bodies or associations as the agent for obtaining and training individual wardens.

SCHEME C

Under Scheme C the responsibility for framing the organisation of the wardens in peace time, as well as exercising control in time of war, could be entrusted directly to the chief officer of police. This scheme is particularly suitable for adoption in boroughs having their own police forces.

THE RESPONSIBILITY OF LOCAL AUTHORITIES

The functions of the wardens will be essentially local, but the responsibility for initiating organisation should rest with the borough and district councils, and in deciding between the alternative schemes of organisation, as set out above, the chief constable of the county should be consulted. It is not considered essential that the same scheme should be adopted in all parts of the country, although it would be inconvenient if any county became a patchwork of diverging schemes, and here the suggestion is made that a conference of local authorities in the county or parts of the county, the chief constable being present, would serve to secure practical agreement. Whatever scheme of organisation is adopted the wardens should be treated as a distinct service, but where organised under a chief constable the control would involve more work than could be borne by the police force; and while the chief constable or the senior police officer in the area would have the control, a chief warden with special staff would be necessary to do the detailed work under him.

TRAINING FOR AIR RAIDS

The memorandum adds details as to the executive control of local schemes, the distribution of the wardens' posts and the numbers required, and concludes with advice in respect of the training of the wardens for meeting air raids. This, it is said, should cover the following subjects:—

(*a*) A general knowledge of the local air-raid precautions organisation.
(*b*) A knowledge of anti-gas precautions.
(*c*) A detailed knowledge of the scheme for distributing civilian respirators in their particular sectors, when that scheme has been drawn up, and of the sources for obtaining replacements in time of war.
(*d*) A detailed knowledge of their duties: (i) in advising and assisting the general public in matters of air-raid precautions generally; (ii) in assisting the local air-raid precautions services; and (iii) in reporting damage to the proper centre.

Wardens, it is added, should be fully conversant with guidance issued by the Home Office to householders generally, and should be able and ready to advise the inhabitants of their sectors, both in peace and in times of emergency, on points connected with home precautions, or any special instructions issued—e.g., removal of people from unsafe areas.

REMINISCENCES OF PAVLOV.—Stories and incidents from the life of the Russian physiologist, I. P. Pavlov, as told by his associates and pupils to Prof. K. S. Koshtoyants, of the All-Union Institute of Experimental Medicine in Moscow, will shortly be published by the Academy of Sciences of the U.S.S.R. in book form. Dealing with the period 1870 to 1905, the book will give a glimpse of Pavlov's early scientific work, the methods he elaborated for studying the physiology of digestion, and of the activities of his laboratory. The Academy is also preparing for the press an academic edition of the complete works of Pavlov, edited by Academician Orbeli.

BOURNEMOUTH

CONFERENCE OF THE BRITISH HEALTH RESORTS ASSOCIATION

THE keynote of this conference, held at Bournemouth on March 12th–14th, was the need for more knowledge of climates. At the opening session, when the Mayor of Bournemouth took the chair, a discussion took place on

Wintering in England

Lord HORDER pointed out that weather was not the same thing as climate; for that reason there were many advantages of wintering in England irrespective of whether the sun shone or not. Exact knowledge about climate was not available to guide a doctor in his recommendation of choice of resort; he could not be sure what air would suit a patient. Lord Horder felt that the doctors of the resorts should get together and pool their knowledge in order to help those who were trying to cater for the invalid. Speaking more widely of health resorts in winter, he said that the availability of sea-water was of great importance and deserved attention. Shelters and covered walks could be provided against the weather. Great Britain was unique in its capacity to produce raw products but too often spoilt them in the cooking; the old English inn must have been a roaring success and he did not see why the English hotel should not be as good as the continental one. There had almost come to be an amenities front and he wished to see it kept at the best. In particular, attention should be paid to safeguard against noise. There was the rowdiness of the adolescent and the deafness of old age, but there were people whose appreciation of a health resort depended on the care spent in controlling noise; there were so many stresses and strains in modern life that could not be escaped; why put up with that of noise when it could be dowsed? The noisy waiter should be eliminated as noisiness was infectious and spread.

Sir JAMES MARCHANT said that a thousand years ago an early visitor to Bournemouth had been Sweyn, the son of the King of Denmark, who came for three successive winters and had to be heavily bribed each time by the King of England to go away. No country had so many types of scenery in so small a compass as England; were the health resorts doing all they could to preserve their natural qualities? The ironical thing was that the vandal knew a beauty spot when he saw it. The resorts should have belts reserved for bungaloid fungus and slabs of flats, and any vandal wanting to put up a building without an artistic architect's supervision should be made to choose a site in that belt. The architects might hold licences and lose them if they permitted an eyesore outside the belt. Noise and ugliness should be segregated. The individualism which now marked the business of the health resorts should develop into a coöperative effort of all sections to plan the future of British resorts. The medical profession might discover other ways of making greater use of them. The first line in the national defence was public health and our health resorts should be held in trust for the nation; with the coming change in age-distribution there would be a vast increase in the numbers of potential customers.

Dr. K. R. COLLIS HALLOWES said that the majority of English people could winter in England more comfortably than abroad and with careful selection

resorts could be found to meet all needs. Some thought that an equable climate made a resort by itself, but for therapeutic success man's forethought was needed too. In this country much more knowledge of climatology was required. The medical men of the resorts should get together as the doctors at the inland spas had done and with the help of municipal authorities the resorts should combine in research work. It was sometimes assumed that the suitability of a marine resort for winter residence could be decided by comparisons of the tables of meteorological figures and by digesting the attractively phrased literature issued by publicity departments, but these could not determine the reactions of an individual to a climate. At some only of the marine resorts the meteorological station was under the supervision and control of the meteorological office. Other records taken might have little value, giving "pocket-climate" averages not comparable with those distinguishing other resorts. Even at controlled stations along the coast, readings were taken under different conditions and were often not comparable. Thunderstorm statistics were not always based upon official definitions but upon the opinion of the observer. At present the figures recorded for ultra-violet light were of problematic value, as the method used was not recognised by the Meteorological Office and the recording tubes were likely to be differently read by different observers. Then, the invalid wanted to know what happened during the "invalid's day" between 9 and 5 rather than during the night, but the present methods of recording seldom indicated the humidity or the duration of frost or of rain between those hours. Resorts should develop differently according to their amenities, and should cater for all weathers; there should be provision of social centres, clubs, indoor swimming pools, cheap transport between beach and apartments, combined season tickets for admission to municipal amenities, and ample facilities for sports. Many winter visitors would prefer simple cooking, especially more attention to vegetables and more choice from pork on Sundays. Medical practitioners had recently been urged by the British Medical Association to seek election to town councils, on grounds that such representation would be beneficial for the profession, the town council, and the community. At winter health resorts such representation should ensure greater efficiency in development and strengthen the "Wintering in England" movement. The marine resorts had in sea-water unlimited supplies of a natural mineral water of known therapeutic value, which was entirely suitable for all bath, douche, and other methods of external treatment.

Sir JOHN ATKINS said his impression was that some patients should winter abroad if they could afford to but the perils of the journey should be remembered: exposure during the crossing and bother at the customs were examples. It was better for some patients to winter in England but the resorts must pay attention to the needs of the patient and his friends. He read a letter from one patient saying, "I'm sure you have no idea how deadly dull it is here." Abroad there were plenty of opportunities for recreation and the English resorts which did not cater, as Bournemouth did, for the visitor might as well be ruled out as far as wintering in England was concerned.

Sir ARCHIBALD WEIGALL mentioned the enormous improvement in foreign spas and resorts in the last few years. Other reasons for going abroad were the escape from the commercial atmosphere of the patient's ordinary life and the attraction of the recreation of gambling. He mentioned the restriction imposed on English hotels by the licensing laws and said that the overhead charges due to legislation relating to employers and employees made cheaper and better accommodation impossible.

Dr. G. DE BEC TURTLE had found that if patients felt they were at their best on their native heath they should be sent to the resort nearest to it.

Dr. W. ASTEN stressed the importance of taking accurate meteorological readings and of putting them on a uniform basis.

Dr. ALFRED COX thought the hotel industry was unfairly treated by legislation; charges had to be high in consequence.

The Mayor of Poole mentioned the great importance to health resorts of attracting not only visitors but also suitable residents, for example the retired Britons returned from the colonies.

In the afternoon session, when Dr. S. WATSON SMITH took the chair, the subject of discussion was the

Curative Action of Sea Climate

Prof. OTTO KESTNER, M.D., said that the gain in health and vigour obtained by living for some weeks by the sea was a matter of common medical experience. In order to find out the mechanism of this peculiarity of the sea he had carried out investigations at the health resort of Wyk on the Island of Fohr in the German North Sea, on adults and children. He had found that healthy adults showed very little reaction to changes in climate; but children, both healthy and ailing, reacted more and so were better for observation. In them he had noted many changes. The oxygen consumption was increased at the seaside as it was also in the Alps, and in both places this increase in metabolism was associated with retention of nitrogen. Thus there is implied a building up of new tissue and that had been observed in adults and children; the circumference of the arms and legs definitely increased, that of the abdomen diminished. The level of nitrogen excretion fell below that of the intake during the stay at the seaside, returning to normal when the children went home. The curve of growth of the children similarly took an upward turn when they went to the sea and continued in a course parallel to its former gradient only on their return.

At first he had found a correlation between the hours of sunshine and the increases in hæmoglobin and red cell count, but that was when the children went down to the sea only on sunny days; when they were sent regardless of the weather it was found that cold wind and fresh air had the same effect as the sunshine. The stimulus of the sea increased the secretion of gastric juice, which he had measured by means of test-meals; the hydrochloric acid content was higher and was not further increased by histamine, suggesting that it was already maximal. A stay on the sea-shore seemed to be a better way of increasing secretion than giving histamine. The movements of the stomach were accelerated and even the finely regulated system of the blood-sugar curve was not quite the same by the sea as in hospital. There was no danger in satisfying the greater appetite even in people with low specific dynamic action who were inclined to grow fat, because the raised metabolism protected against that. The increased appetite at the sea was very valuable for many of the children. A good proportion of them were under-nourished and for that reason had poor appetites; such children did not eat enough, even if the supply of good food was

provided by parents, schools, or charity. The action of the sea air was then of the greatest use in breaking a vicious circle.

The place of action of the sea climate was the skin. Humans differed from other mammals in being naked, an attribute only recently acquired in the scale of evolution. Many animals regulated their temperature by adjusting their combustion in the liver and elsewhere; in man alone the adjustment was made by dilatation and constriction of the capillaries of the skin. If a man were cold his capillaries contracted down, leaving a relatively avascular skin and layer of subcutaneous tissue which served him as an overcoat. This was the best method of thermal regulation, excelling any found in animals, but was liable to be lost owing to our way of living. Prof. Kestner had examined the reaction in the children by touching the skin for three seconds with ice and timing the change from whiteness to reddening in the skin. In healthy children this took only two seconds, but took five in convalescent children before their stay at the sea. As the results of the stimuli of the sea, sun, cold air, and cold water, the capillaries of the skin learnt their gymnastics again and the children could bathe in the sea and play naked in the open air, even in winter time, without a decrease in body temperature. The children in the convalescent homes at Wyk were in the open air for not less than four hours daily and twice a day for from five to thirty minutes naked even in winter; the children liked it and were unhappy if forbidden to join in the capillary gymnastics. The skin reactions were also sometimes sluggish in those with high blood pressure. It was a rule of pathological physiology that a good remedy worked more energetically on the pathological than the normal organ. Curschmann, who was continuing the observations, had found that the blood pressure was not altered in normal people by sea-bathing but was lowered in those with high pressure. It could be decreased for a considerable time by repeated sea-bathing in patients who had no anatomical alteration of the vessels. Curschmann had called the sea-shore the hypertonic's paradise.

In conclusion the speaker emphasised that the stimuli of the sea-shore could only be effective if the patients exposed their skin to them and there was no sea climate in the sheltered rooms of homes and hotels. When the doctor could adjust the dose to the individuality of the patients, the sea climate was a powerful remedy.

Sir WALTER LANGDON-BROWN quoted Dr. Leonard Williams's dictum that "To prescribe change of air with intelligence it is necessary to have some knowledge of climatology; to prescribe it with success it is essential to have some acquaintance with different localities." He had often been asked by patients to recommend a climate which was warm, dry, and equable to which he replied that they might find it in Heaven but that they would not do so on earth. The moisture in the air was a potent factor in maintaining an equable temperature; in a dry climate the temperature was of necessity liable to considerable fluctuations, and on the high veldt in South Africa he had seen a mirage at three o'clock and hoar frost by half-past six. Such a climate, however stimulating to those who were well, was trying to those who were in poor health. Man had been described as an automatic thermostat but the maintenance of a constant temperature imposed a tax on the heat-regulating centres and on the heat-producing structures in the viscera. The importance of rest in the treatment of febrile tuberculosis was clearly recognised. It was also true that a fairly constant environment saved effort on the part of the heat-regulating mechanism, a fact of importance for those suffering from physical or nervous exhaustion.

The seaside could not claim to offer a panacea in the way of climate; gouty subjects usually did better at an inland resort. Some with paroxysmal neuroses did not do well though in this respect as in so many others the asthmatic expressed his idiosyncrasy. Bracing marine climates were not always suited to cases of insomnia, but he had found, like many tired or neurasthenic patients, that Bournemouth increased the natural capacity for sound sleep. For chronic bronchitis and emphysema the conditions provided at Bournemouth by equable temperature, humidity, and pine-laden breezes were admirable. The treatment of bronchiectasis had passed into a more active stage in which the surgeon participated, but for the convalescent after his somewhat drastic handling Bournemouth could offer many advantages. Heart diseases had been mentioned as an indication for treatment in the district, but the category should not include those with any suspicion of active rheumatic carditis. The group called the diseases of civilisation—hyperthyroidism, diabetes, hypertension, and peptic ulcer—were all becoming commoner with the increasing pace of civilisation. To those might be added what Crile called neurocirculatory asthenia, generally due to emotional causes operating through the sympathetic nervous system; this had been treated by denervating the adrenals, which seemed like jamming on the brakes because the engine was running too hard. He would prefer to change the environment and mode of life, to quiet the engine down. For all conditions where the "kinetic drive" of modern life had been too much for the individual he found reasons why a marine climate of the type provided at Bournemouth formed a useful and helpful part of treatment.

Dr. S. WATSON SMITH reviewed the outstanding characteristics of marine resorts of the east and south coasts of Great Britain, and said that the recommendation to be made to a patient depended much on the nature of the case. As a rule the climate should be an equable one, usually in a coastal town. The medical profession now recognised that our own coastal resorts belonged to the most health-giving in the world and that they could be used by the patient with greater likely benefit than any abroad. It seemed logical that an invalid should find a climate akin to that of his native air preferable to any foreign one; in addition there were here no language difficulties, no insuperable dietetic obstacles, no overheated rooms, no un-English entertainments, no long tedious journeys there and back, and no long-distance separation from home and relatives. Bournemouth could boast of a number of climates, so that some choice might be made of the district for the patient, whether near the centre of the town or in one of the several chines, or in the north of the town or on the uplands behind. Plethoric people and those with high blood pressure did well in that relaxing climate (using the word relaxing in no derogatory sense but as meaning sedative); so did those with insomnia. Rheumatic fever and acute articular rheumatism were practically unknown in the district, and this fact seemed a powerful argument for establishing a hospital or home for rheumatic children. Rheumatoid and osteo-arthritis were not found difficult to arrest in that climate. Fibrositis, on the other hand, was best treated at a spa. Stone in the bladder was seldom met with; patients with chronic disease of the kidneys or bladder and anæmia were repeatedly found to benefit by residence there.

Dr. A. G. S. MAHOMED suggested that the old medical classification of phlegmatic, sanguine, and other types might now be explained in terms of hormonal variations and might serve as a basis for explaining the different effects of climates on individuals.

Hospitality

In the evening the Mayor of Bournemouth entertained the delegates to dinner at the Pavilion. Dr. W. ASTEN proposed the health of the Association, saying that throughout its life it had been an advocate of British health resorts, not only in summer but all the year round. He congratulated the Association on its handbook. Marine climatology had been much neglected mostly because a sufficiently important place had not been found for it in the medical curriculum. Doubtless that error would be corrected when excessive interest in physical medicine, nutrition, and the vitamins waned. He liked to think of the tripartite coöperation of the medical profession, local authorities, and the State, but it should stop at the point of federation. He was sure that a complete State medical service was contrary to the country's ultimate welfare. It might conceivably even intensify the amount of self-drugging among the public, for mysticism and superstition still existed; on the other hand the medical profession sometimes took itself too seriously and its advice was disregarded with the result that the patient got on very well.

Sir WALTER LANGDON-BROWN replying, regretted the loss during the year of Colonel Elliot; he had been a good conjurer and his greatest feat had been to make the British public proud of its health resorts. The attractions of foreign resorts were the three "W's": the weather, welcome, and wine. Characteristically the foreigners advertised their good weather, the English only their bad. Anyone receiving a better welcome than that of Bournemouth was lucky. The wine cellar was certainly a difficulty, but the restrictions on currency abroad were much more irksome to him.

Sir ARCHIBALD WEIGALL, proposing the toast of the county borough of Bournemouth, said that legislation had never distinguished between pleasure and health resorts; the latter should be entitled to privileges by holding certificates from the Ministry of Health. The tendency of the day was to pour out legislation for the local authorities to administer. The measures unfortunately brought the rough-and-tumble of party politics into local affairs; he hoped the local authorities would not lose their individuality.

The Mayor of Bournemouth, responding, said that the town's reputation had been built up as a place of health and recuperation from the earliest days. The impression still lingered from past times that holidays were cheaper abroad. The Association had done much to tell the public that they could get as good and as cheap a holiday here as elsewhere. Bournemouth hotels were as good as any. He thought many went abroad to avoid the petty and irksome restrictions which amazingly existed in spite of democracy.

The delegates made a tour of the town on the last day.

HOSPITAL AMALGAMATION AT BRISTOL.—The governors of the Bristol Royal Infirmary have decided upon amalgamation with the Bristol General Hospital. The amalgamation is, it is stated, unanimously supported by the committees of both hospitals.

MEDICINE AND THE LAW

Motorist and Insulin

THERE were doubts on the law as well as on the facts in a case at Bow-street police-court last week. Charged with driving a car "while under the influence of drink to such an extent as to be incapable of having proper control," a motorist said that his condition was due not to alcohol but to a double dose of insulin taken on an empty stomach. The learned and experienced magistrate is reported to have remarked that it was clear that in the next Act of Parliament such people should be included with those under the influence of drink and unfit to drive. But are they not already included? The words in the Road Traffic Act are "under the influence of drink or a drug." Is not insulin a drug? There is nothing in the Act to indicate that the drug must be an illegally administered narcotic. The motive for taking the drug is immaterial; the Act is concerned merely to forbid motorists driving when they are not in a proper condition to drive. The magistrate went on to state something of great importance. "A motorist under the influence of an overdose of insulin is," he said, "from the public point of view an equal danger to one under the influence of drink." If so, we may infer that the police might have secured a conviction by charging the motorist with having taken a drug. It is not the law which needs to be altered, but the form of the charge.

The facts stated for the prosecution were that there had been a collision in Gerrard-street. The motorist was said to have turned out of Macclesfield-street and to have collided with a stationary car. A policeman said he found the motorist unsteady on his feet and smelling of alcohol; on the way to the police-station he became violent; when two policemen got him as far as Piccadilly he refused to go any farther and sat down in the road. The police surgeon said that the accused told him he suffered from diabetes and had taken a double dose of insulin and had had no food. The witness agreed in cross-examination that the effects of a strong dose of insulin would be light-headedness, irritability, clumsiness in moving the limbs, and perspiration; persons, in fact, who have taken alcohol and persons who have taken insulin exhibit certain common symptoms. The magistrate observed that there must be some doubt whether the man's condition was due to alcohol or to insulin. The case must therefore be dismissed. The police, it would seem, in future cases of this kind will have to make up their minds whether to charge the taking of drink or the taking of a drug. Whichever charge they select, they must be prepared with evidence to remove the doubt which last week was fatal to the prosecution.

Negligence Alleged against Mental Hospitals Board

The protection which medical practitioners and others believed they had been granted by Section 16 of the Mental Treatment Act, 1930, has been invoked in vain by the Lancashire Mental Hospitals Board and two of its officers in a case which was taken to the Court of Appeal. Mr. and Mrs. Holgate of St. Anne's-on-Sea are plaintiffs in an action arising out of injuries inflicted on Mrs. Holgate by a patient who was let out on licence from the Calderstones mental institution. They allege that the board and the officers concerned acted without reasonable care

in allowing the man to be at large. Section 16 bars their claim unless they obtain the leave of the High Court; leave is not to be given "unless the court is satisfied that there is substantial ground for the contention that" the proposed defendants have "acted in bad faith or without reasonable care." The plaintiffs' application for leave came before Mr. Justice Talbot. One of their allegations is that the officer who ordered the release of the patient had no power to do so. The judge granted leave and the three judges in the Court of Appeal have unanimously declined to interfere. Lord Justice Greer observed that Mr. Justice Talbot was right in holding that there was substantial ground for the contention that the defendants acted without reasonable care; "whether that contention will prevail at the trial, I cannot say."

It will be recalled that Section 330 of the Lunacy Act of 1890 contained a weaker safeguard. Persons responsible for the certification of a lunatic were not to be liable to civil or criminal proceedings if they had acted in good faith and with reasonable care: proceedings could be stopped by the court if the court was satisfied that there was no reasonable ground for alleging want of good faith or reasonable care. The startling results of the Harnett litigation and similar cases led to the change in 1930 whereby the burden was placed on the plaintiff in the terms already cited, instead of it being for the defendant to invoke the safeguard by proving "no reasonable ground." Section 16 of the 1930 Act has been of considerable value and the grant of leave thereunder has been rare. The trial of the Holgate case will evidently be of considerable interest.

VIENNA

(FROM OUR OWN CORRESPONDENT)

TULARÆMIA IN AUSTRIA

In a paper recently read before the Vienna Veterinary Society, Prof. David of the Veterinary University discussed the problem of tularæmia. This disease had become known in 1906, when after the great earthquake in San Francisco cases were observed which resembled plague, and which were also noticed in animals, especially rodents and wild rabbits. In Austria the first case was reported in 1935. The chief symptoms were conjunctivitis and lymphadenitis, and soon afterwards another case was observed in the eye clinic. Both patients had handled diseased hares and jack-rabbits. Within the last four months over 200 cases have been reported from all parts of Austria, the majority coming from a country district not far from Vienna. Males were attacked much more often than females, the ratio being 70 to 30. The cases differed in no way from those reported elsewhere. There is an ulcero-glandular type, when infection occurs through contact with an infected rabbit or other infectious material, and an ulcer appears on the finger or hand, as the "primary lesion," with enlarged glands. In other rarer cases only glandular swelling is noticed, often combined with conjunctivitis (the oculo-glandular type) without the primary ulcer, but the glands tend to break down later, producing the "secondary lesions." It is not quite sure whether infection by insect bites has occurred in this country. Treatment consists largely of rest, good feeding, surgical drainage of suppurating glands, and general symptomatic care. In America a special anti-tularense serum (Foshay's serum) has been used with apparently good results. Laboratory tests show a specific agglutination, which appears in the second or third week of the infection. The disease is followed by a lasting immunity. It is very easily transmissible and highly infectious: in spite of the rubber gloves, overalls, face covers, and cellophane eyeglasses, which are used in the laboratories, one person assisting at a post-mortem was infected recently in Vienna. Prophylaxis necessitates the strictest cleanliness in handling living or dead rodents. Animals found dead are to be regarded with extreme suspicion. In view of the economic importance attached to this matter, compulsory notification of all cases observed in man or animals is urged by Prof. David.

A NEUROLOGIST HONOURED

A few days ago the eightieth birthday of that eminent authority on diseases of the brain and the nervous system, Prof. Wagner von Jauregg, the discoverer of the malaria treatment of general paralysis of the insane, was solemnly celebrated by the Austrian Society for Neurology and Psychiatry. Representatives of the Government, the University, and of numerous learned societies at home and abroad were present and paid homage to the scientist, who was himself prevented by ill health from attending. The president of the society, Prof. Otto Pötzl, the successor to Wagner-Jauregg as chief of the clinic, described how just 50 years ago Wagner-Jauregg conceived the idea of artificial hyperpyrexial therapy, having observed that an insane woman showed considerable improvement after an attack of erysipelas. It took him 30 years before he could fully work out all the details of his method in 1917. It is interesting to note that in this instance the discovery had its origin in observation and experience, the theoretical foundations having been laid down later by Hoff and Silberstein. They showed that just the malaria infection produced an increase of the anti-syphilitic qualities of the blood and brain tissues, whilst typhoid or tuberculous infection which were also tried against syphilis gave no satisfaction. Prof. Pötzl also called the attention of the audience to the remarkable fact that the original strain of *Plasmodium malariæ*, which Prof. Doerr had placed at Jauregg's disposal in 1917, was still alive and active after having undergone 481 passages through human hosts. The study of its peculiar variations and alterations in itself was an important contribution to malarial research. Prof. Pötzl went on to describe Wagner-Jauregg's other great discovery, which has largely contributed to the successful fight against goitre and cretinism in the Alps. On Wagner-Jauregg's advice ordinary salt was charged with a minute quantity of iodine (1 mg. per kg. salt) and thus sold to the population of the districts in the Alps affected with hypothyroidism. The results are most gratifying. It may be just mentioned that Wagner-Jauregg has been awarded the Nobel prize for medicine for his discovery of malarial therapy, and a gold medal commemorating his work has been struck and presented to the Vienna Neurological Clinic, which will henceforth be known as "The Wagner-Jauregg Clinic."

VON SCHRÖTTER'S CENTENARY

The second person whose work has recently been honoured, by the celebration of his centenary, is Prof. Dr. Leopold von Schrötter, who died suddenly in 1908. He was an eminent scholar in materia medica, but his chief importance for medicine and for Vienna was the fact that it was he who brought laryngology—then a new branch of medicine—to the level of a recognised specialty. His efforts succeeded

in instituting a special clinic for laryngology in Vienna, the first of its kind in the world. His genius and his splendid qualities as a research worker made him, entirely self-taught in this work, a great authority on diseases of the larynx and trachea. The other side of Schrötter's life-work is connected with the fight against tuberculosis. It was due chiefly to his incessant endeavours that the system of sanitorium treatment and open-air therapy was introduced to the then existing Austrian Empire. Tuberculosis of the respiratory organs at that time was termed here "morbus Viennensis." A statue of Schrötter, which has been placed in the Hall of Honour of the Vienna University, was unveiled on his centenary in the presence of the leaders of science and of the government.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index.

FROM A RUSTICATING PATHOLOGIST

IV

No one that I have asked has been able to tell me who invented the idea of tarring roads. It was a very great discovery, worth a peerage and a fortune as well as the preservation of a name, as anyone knows who remembers what the dust nuisance was like just about 30 years ago, when you had to get off a bicycle after passing an automobile because you could not see and when main roads were bordered with empty houses in which no one would live if they could help it. Knowing what we do about the delay between the beginning of an irritation and the appearance of a tumour in mule-spinners and shale-workers, it seems possible that this dust may have had something to do with the increased incidence of cancer of the lung in recent times, asking pardon of those who do not believe that there has been any increase. Various things were tried, hygroscopic salts such as calcium chloride and so on, but tar was evidently the real solution, though it was not at first very popular because relatively few people had cars and many had dogs which enjoyed cleaning their feet on the drawing-room carpet or the spare room bed. Blatant utility is no royal road to fame as the improvements in medicine show. I do not suppose that any drug has contributed much more to human happiness than aspirin; there are many which are more indispensable and do much more to save life, but from the consumers point of view there are very few that are of so much use to him in getting through the changes and chances of his life. But I have no idea of the name of the man who brought it into use (which may of course be just ignorance) and Einstein is better known to the general body of people who eat it. Nor is aspirin celebrated when orations are made about the progress of medicine. There are I expect several reasons for this. One is that while the patient wants chiefly to be comfortable, the doctor wants to make him well and keep him alive. Another is that medicine always has been and still is a learned profession and discoveries are valued for being rational, for fitting into and extending the scheme of knowledge, as well as for being useful. Banting's discovery of insulin was rational: a dog without a pancreas has diabetes; if the duct is tied the secreting tissue disappears, the islands of Langerhans survive, and the dog does not have diabetes; therefore there must be something in the islands which prevents diabetes. And it was so, though curiously enough the use of insulin has turned out to be empirical, for there is no agreement yet as to how it works. Lister's discovery of antiseptic and aseptic surgery was thoroughly rational. So is Rosenheim's mandelic acid the rational result of a deliberate search for a substitute for the oxybutyric acid of the ketogenic diet. Liver for pernicious anæmia was partly rational and no more could be expected, since it was only by its use that the nature of the disease was revealed. But aspirin is about as rational as sarsaparilla and it suffers in estimation accordingly.

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Our local paper has just published a reprint of its first issue, which came out on Jan. 28th, 1837, to maintain "the real liberties of the People consistently with due reverence for the law, the preservation of the unimpaired establishments of the Church, the maintenance of the just prerogatives of the Monarch, and of the privileges of the Hereditary Aristocracy of the land." Under such auspices one can hardly suspect the extraordinary value of Woodhouse's Balsam of Spermaceti or Pectoral Cough Drops, one dose of which, the advertisement says, will relieve "most affections of the chest and lungs in ten minutes" and as a guarantee of good faith "persons doubting the efficacy of this medicine may take a dose in the Proprietor's shop before they purchase." The balsam was peculiarly valuable for the prevailing epidemic of influenza which led to the ball at the Subscription Rooms being very thinly attended despite a sumptuous supper, and to "awful and horrid" scenes when attempts were made to bury several hundred people in a day in St. Pancras graveyard. I wish I could say that the paper also records an exceptional mortality among the local polecats but nothing so interesting can be found, and the cause of the epidemic is held to be "no mystery" since it was plainly due to a sudden change in the atmosphere "from great dryness to great humidity, both states being accompanied with a severe depression of temperature." But how proud Mr. Decimus Woodhouse must have been to have a pectoral cough drop which would cure it in ten minutes—if only the public would take it. Does the recipe still survive? For we still lack such a certain cure.

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Nor do we yet know how an influenza epidemic comes about. The definition of the virus which has an ætiological relationship to the disease has given us a great deal of pleasure—æsthetic pleasure at a particularly elegant piece of work and carnal pleasure at the prospect of a vaccine—but it has introduced great complications into the epidemiological problem. To relate epidemics to the weather and the seasons as such had a stately simplicity about it which was and still is attractive, and the necessary sensationalism was to be had out of earthquakes and other paroxysms of nature. If children's diarrhœa began to be serious when the 4-ft. earth temperature had reached a certain level—well, there it was, a delicious piece of

information for the curious and singularly deterrent to any practical action. When Dr. Johnson and Mr. Boswell went to the Hebrides they heard a good deal about the "boat cold" at St. Kilda: Johnson thought the whole thing was a sham and that the islanders went on coughing because they did not like visitors and did not want to talk. How mysterious it must all have seemed in 1773 and how satisfying the explanation that it was not the arrival of the boat at all which caused the catarrh but the north-east wind which was necessary for the trip from the mainland. But the parasitologists have changed all that. We now have two sets of facts—the relation of epidemics to the weather and the season of the year (which are not necessarily the same thing) and their relation to the complicated interaction between the host (with its varying susceptibility and resistance) and the parasite (with its varying virulence and infectivity). Only for plague do we seem to have anything like a complete account. Human plague depends on the abundance and activity of the fleas which transfer it from rat to man, and it ceases when these are sufficiently depressed by the weather—by dry hot weather in India, by a cold winter in England. "A green Christmas means a full churchyard" may perhaps be a reminiscence of the disease which was for more than 300 years a major cause of death in this country. In some other diseases—e.g., diphtheria—the host-parasite interaction is fairly well understood, but the new discoveries have not yet been fitted on to the old facts that they are seasonal afflictions. On the whole it seems likely that the immunity of the host is about the most cogent factor, and that the spacing of epidemics may be determined by the accumulation of susceptible individuals either by birth (as in measles) or by the lapse of acquired immunity (as perhaps in influenza). But those who have had the luck to have been trapped into reading Creighton's "History of Epidemics in Britain" will know that there are other sides to the whole question. It is indeed a good thing that he was a heretic and did not believe that bacteria were the cause of disease, but it would be better if someone who does believe in them could imitate his industry and scholarship and write a new edition: I wonder if the obvious man is doing it. It would be something if we could know how much truth there is in the conclusion which was so clear in 1837 that cold wet weather causes an epidemic of influenza: there are masses of modern data waiting to be analysed.

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Which brings us by a natural drift of gossip to pass a word or two about the healthiness of different places and their climates. When Cæsar landed in Britain he found civilisation at its brightest in the south-east, and it is the same to-day. And it is difficult to think that climate has had nothing to do with that amazing aggregation of 7 or 8 million people living closely packed together in the London area and leading healthy, I hope happy, and certainly productive lives. The London climate is indeed exhilarating, physically, intellectually, and spiritually, and as usual it is impossible to disentangle body, mind, and spirit which all work together for healthiness, backed up as they are by a very efficient public health service. In the summer it is about the hottest place in England, and in the winter as cold as anywhere, which is probably good for us, though the excellence of its air depends chiefly on its being dry so that our skins evaporate quickly and keep cool. Going to the west is equivalent to putting on a rubber mackintosh, and human vitality deteriorates as is seen in the relatively high death-rates of purely rural areas in Cumberland, Westmorland, West Wales, and the south-west: "Devon," they say, "is no good to anyone between 4 and 40." In Cæsar's time the people in these places were probably still in the Stone Age, and it is still true that the districts which are blessed with a good supply of really soft water to shave with lag behind the south-east in the maturation of human qualities. The effect of damp air is of course like all environmental factors relative to the material on which it works. On any rational scheme Lancashire ought to be a very inferior place: there are more people than in the London area (though not so tightly packed) and the climate is horrid, especially in the summer. That the inhabitants are what they are and do what they do can be due only to their almost preternatural qualities: it is one of my few quarrels with fate that I was not born a Manchester quaker. Apart from rheumatism, for which all neighbourhoods are bad, places differ among themselves a great deal, and what surprises us is that people go on living in bad places when better districts are available. As William James says, it is of course inherent in man to prefer life on any terms to no life at all, but that is not actually the alternative offered to those who inhabit Central Asia, Tierra del Fuego, Arctic Canada, and even Orkney which has, so the returns show, 79 gales per annum, or Derby where the sun seldom shines. Emigration there has been in plenty but seldom depopulation. The truth seems to be that most people, irrational as they are and ought to be, prefer the place they are used to and the mode of life which goes with it. The locality for which they have the feeling that it is their own is for them the best, which is perhaps why no author of a guide book can help turning his account into an argument that the district he is writing about is actually God's own country. Mark Rutherford is exceptionally honest: when he is trying to make the best of Bunyan's country he can get no further than "it has a wide sky and it is quiet," which naturally makes everyone want to go to Elstow and have a look at it.

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Amongst all the progress of medicine which has marked the 100 years of the local *Standard*, the belief in the curative qualities of air seems to have declined, and dying men have given up gadding about as they used to. Knowledge of the world has shown that man can live very nearly anywhere without being very much altered: the north and south poles and the top of Everest seem to be just within or just outside his capacity. Hence the view that how a man lives is more important than where he lives, which is one of those improvements which have come from a better appreciation of the general nature of diseases. There has been a decline of the mystical view that a disease is something imposed on the body for which somewhere in the world a herb, a stone, an atmosphere, or what not is to be found: and with this a rise in the pathological outlook which sees that the body always tries and generally succeeds in curing itself, and that a great deal may be done in helping incurably lame dogs over degenerative stiles. It seems to me, as a patient who has spent a good deal of time in post-mortem rooms, that the improvements in diagnosis and treatment in my own time have also been very great though not, I imagine, any more than in other branches of human activity or in the preceding

medical generation: the patient now has a much better time than he used to have when there was no antitoxin for diphtheria and no anæsthetics for tooth-drawing (at any rate for children). The whole business now is far more rational than it was, and the concentrated object of medical research is to make diagnosis and treatment a logical science. But perfection in this aim is and will be as elusive as Major Road; and, speaking as a grateful patient, I was rather shocked to read in THE LANCET the other day that the conservator of the Hunterian Museum thought that the student should be well trained in the experimental method because he would find when he came to clinical work that diagnosis was conducted in the same way: in Dr. Beattie's Garden of Eden clinical data "when properly correlated and analysed according to the rules of the experimental method, lead to a conclusion as scientific as those of the investigator in a physiological laboratory." This is either bad experiment or bad medicine. If an experimenter wants to find out what 2 and 3 add up to, it is obligatory on him to be sure that what he thinks is 2 really is 2, and that what seems to be 3 actually is 3: until he can be certain on these points it is entirely illegitimate for him to draw any conclusion about their sum: if he cannot reach surety he must put the matter aside and tackle something else or take a holiday. It has always seemed to me that the great trouble of the doctor is that he has to do sums with numbers which are often very uncertain and his great pride that he usually gets the answer somewhere near right. If he failed to come to a conclusion adequate for action, he would be a bad doctor; if he drew a conclusion from such froward data he would be a worthless experimenter. And, again as a patient, I judge that his first business is to be a doctor. The clinician is indeed in the same predicament as Johnson was over his dictionary: "to deliberate whenever I doubted, to inquire whenever I was ignorant, would have protracted the undertaking without end and perhaps without much improvement." And both parties have extricated themselves pretty well: to cure a patient without knowing what is the matter with him is no mean performance.

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Only in one particular does medical practice seem to have deteriorated. The layman now takes more interest in and knows more about technical details, and he has become more critical: correspondingly the doctor has put off some of his authority with his priestly vestments. It is all to the good that the doctor should wear a soft hat, and the maintenance of good health, if not the cure of disease, is better attained by intelligent coöperation than by arbitrary rules: indeed the whole sanitary progress of this country, from Chadwick and Simon onwards, has been achieved by inviting the public to behave in a common-sense way rather than by orders from Whitehall. But with this gain there has also been some loss of confidence which is of no help to the patient. One of the greatest—perhaps actually the greatest—service which a doctor can give to a sick man is to relieve him of all responsibility about his own conduct, and there is no more satisfactory asylum than a hospital bed. There is no more worry about what he shall eat or what he shall drink or wherewithal he shall clothe himself: he is dressed and washed and fed *p.r.n.*, nor need he concern himself about what is the queer-tasting stuff he has out of a small glass; it may be nothing more than ritual but that does not matter. That this resignation, this resumption of a baby's position, helps him to get well is simply a matter of experience which at the moment I need not try to explain. Many of my friends are qualified, and I notice that the ones who are too intelligent about their own maladies and cannot forget themselves far enough to believe in a bottle of medicine, do not make the best progress when they are ill. What they need is childlike faith (which is very far from being childish), and if they would only take advantage of their chance to retire for a while from this troubled world they might put it to good use. Was not "Blood Pictures" written in hospital and did not Mark Clark learn all-fours in a whitlow?

PANEL AND CONTRACT PRACTICE

Capitation Fee for Adolescents

ON March 11th Sir Kingsley Wood, the Minister of Health, who was accompanied by Mr. Scrymgeour Wedderburn, the Parliamentary Under-Secretary for Scotland, received a deputation from the British Medical Association, when Dr. H. Guy Dain urged that the fees paid to medical practitioners under the national health insurance scheme should be increased, and that the fee should apply not only to the present insured persons but also to the juvenile workers for whom the Government had announced their intention of providing medical benefit. The deputation suggested that as on former occasions the matter should be referred to arbitration. Sir Kingsley Wood said that he considered that a flat rate substantially below the present figure could well be justified.

Replying to a question in the House of Commons four days later Mr. Hudson, parliamentary secretary to the Ministry, said that the whole matter was to be referred to an independent court of inquiry.

Medical Insurance Practice

London insurance committee is to spend £200 in issuing to each practitioner in its area a copy of "Medical Insurance Practice," to which we referred recently. In the report of the subcommittee which recommended this action is a list of documents issued to practitioners joining the medical list. These include the medical benefit regulations, the National Formulary, the drug tariff, specimens of nine different forms, five memoranda on various subjects, a requisition form for stationery—in all 32 items, apart from the terms of service and the allocation and distribution schemes. This avalanche of literature, primarily intended for the practitioner's instruction in the way to carry out his contract with the committee, is accompanied by no guide or index. The subcommittee has visualised the perplexity of a practitioner, new to insurance work, about which document he should consult in relation to a particular urgent problem with which he is faced.

An Inadvertent Overcharge

An insured woman gave up work on marriage. Shortly afterwards, in January, 1936, she needed treatment, and being under the impression that she was no longer entitled to it she did not, in applying for her doctor's services, represent herself to be an insured person. She told the doctor, in fact, that she had ceased insurance. Towards the end of the year she again became ill and obtained further treatment as a private patient, paying an account amounting in all to £1. In December, 1936, she received a

notification from the insurance committee that her title to medical benefit did not terminate until the end of 1936, and, realising her mistake, she promptly applied for a refund of what she had paid. Clearly this was a case of "genuine misapprehension as to the insurance status of the patient"—a misapprehension largely brought about by the insured woman herself, assisted perhaps by the practitioner's omission to verify the removal of the woman's name from his list. Under Clause 7 (3), as it now stands, the insurance committee can adjust the matter by repaying the £1 to the insured person and deducting it from the doctor's remuneration. But the doctor will be the poorer by the value of the medicines he supplied.

CORRESPONDENCE

THE OVER-TREATMENT OF GONORRHŒA

To the Editor of THE LANCET

"So they do nothing, 'tis a venial slip."—(*Othello*, IV, i, 9.)

SIR,—Modern methods of dealing with gonorrhœa in the male seem to be strangely opposed to the fundamental principles of treatment for other diseases. It is some time now since, as registrar at the London Lock Hospital, I had large experience of this condition. As surgeon in charge of the genito-urinary department of a teaching hospital I see it rarely; for gonorrhœa has been withdrawn from the circle of hospital life and wedded to syphilis (an unhappy and incompatible match), and they live apart in a dark and uncritical world of their own.

It is a common observation that acute urethritis subsides as rapidly as does acute catarrhal rhinitis if the patient do nothing but lie in bed. Unfortunately, social custom demands that gonorrhœa should be an ambulatory disease, and this excellent treatment is seldom practicable. When such rest cannot be given it is surely all the more illogical to irritate the inflamed mucosa by the active measures so frequently employed. It is an axiom that antiseptics cannot destroy gonococci in the urethra without damage to its lining membrane. Gentle irrigation with a mild solution, washing pus out of the anterior urethra, does no harm. Frequently, however, it seems that posterior irrigation is employed from the start of the disease—an illogical procedure which, unless carried out very efficiently, is dangerous. It is for most patients a difficult art, and for some an impossible one to acquire. In a recent case, as often before, I have seen it responsible for an acute spread to the posterior urethra and an epididymo-orchitis. During the acute stage of posterior urethritis bladder irrigation is, fortunately, too painful to be possible. In chronic stages of the disease when the posterior urethra is already infected, filling and emptying the bladder from without with an antiseptic is more venial, but I think compares unfavourably in efficiency and safety with the passage of large quantities of urine.

Much misdirected energy is also devoted to massaging the anterior urethra and the prostate gland. This form of treatment seems to be carried out too early, too often, and sometimes too violently. When active inflammation has subsided and mucous collections are present in Littre's glands, prostatic ducts, or vesiculæ seminales, the occasional use of massage is probably beneficial. Employed earlier in the disease it must be harmful, or all our teaching of first principles is wrong. Employed frequently (daily, or even twice daily, massage over a period of weeks is not uncommon!) it produces a traumatic irritation. Some authorities demand that as a criterion of cure the urine should contain no pus cells even after vigorous massage of the anterior urethra and prostate gland on a full-sized bladder sound. This seems to me a queer test of normality. Surely no urethra, unless tanned and lethargic from months of active treatment, would fail to respond in the natural way to a traumatic irritation of this severity by the extrusion of a few pus cells. The following case shows the futility of indiscriminate massage.

A patient seen recently was having regular massage for old-standing prostatitis. He consulted me on account of painful micturition and slight hæmaturia which accompanied the treatment. I found the urinary passages normal, except for calculi in the prostatic gland!

A second case is eloquent of over-treatment.

A patient with a first attack of gonorrhœa consulted me two months after the onset. Bladder irrigation had been attempted unsuccessfully twice a day from the start, until a left epididymo-orchitis was achieved three and a half weeks later. After an interval of a fortnight, bladder irrigation was again instituted and combined with prostatic and anterior massage on a sound every day. In addition, four injections (? vaccines) were given each week. After a month of this treatment, a smear from the urethra still contained gonococci—and no wonder!

In other coccal invasions we tend more and more to discount energetic local measures, and try instead to build up the patient's resistance. Occasionally we effect a "cure" by extirpating a focus, as in early appendicitis, but otherwise we help the patient to recover. The gonorrhœal patient demands "cure" more urgently than most, and we seem to have taught him to believe that this can only be achieved by assiduous and unpleasant manœuvres. Is the gonococcus an organism with unique behaviour, or is its treatment determined by fear and ignorance on the one part, and lucrative credulity on the other? Present methods unfortunately not only lack the corrective of general hospital practice but indeed are encouraged by a municipality which allots its monetary grants to the various units in proportion, not to the number of patients treated, but to the total number of individual attendances in each department in the course of a year.

Surely a premium on over-treatment!

I am, Sir, yours faithfully,

M. F. NICHOLLS.

Queen Anne-street, W., March 15th.

A CIVILIAN AMBULANCE SERVICE

To the Editor of THE LANCET

SIR,—While the Home Office and local authorities debate and mature their plans for the protection of the civilian population in the event of war and aerial attack, while doctors and policemen are given instruction in anti-gas measures, and moneys are voted for the expansion of fire-brigades, we seem to hear comparatively little discussion of arrangements for the collection, sorting, evacuation, and treatment of the numerous civilian casualties which must, we know, be visualised as occurring in spite of all these measures.

The lessons of the last war and of Madrid, with their small scale raids, have at least given us some measure of what we may some day have to anticipate, and we have reason to believe that gas and incendiary bombs may now be added to high explosive. One

or two large-scale raids might easily fill all the hospitals of a city to overflowing. City hospitals themselves might not escape damage. It is evident that, in addition to aid-posts and clearing stations, large fleets of ambulances would be needed and that a circle of schools and other suitable buildings well beyond the outskirts of exposed towns would have to be equipped as hospitals to receive the casualties.

There are many medical men in this country who will be unwilling, for conscientious reasons, to serve with the armed forces in any future war. There are also thousands of men of military age who will refuse to fight or make munitions. Remembering the fine service given by the Friends' Ambulance Unit and the British Red Cross Society during the last war on behalf of sick and injured civilians, should we not be turning our thoughts to the provision of an adequate medical service for our own civilian population in the event of the attack which we hope will never come? Such a service would incidentally provide urgent and essential humanitarian tasks for numerous volunteers who might be unable or unwilling to serve with the armed forces in any way. For London alone an efficient organisation would require an army of able-bodied ambulance drivers, stretcher-bearers, and orderlies.

There would be no lack of doctors and nurses with experience, both clinical and administrative, gained in the last war, and it should be possible for these, in coöperation with the Quakers, the Red Cross, and St. John Ambulance, and with or without the help of the Government or the municipalities, to organise an efficient scheme. Such a scheme would be in the national interest. At the same time it is not inconsistent with pacific endeavour to envisage alternative forms of humane assistance in the event of war. While making provision for stricken men, women, and children, such an organisation would help to disarm bitterness and avert a vast amount of unhappiness in connexion with conscientious refusal to give military service.

I am, Sir, yours faithfully,

Cambridge, March 11th. JOHN A. RYLE.

MORE AND SAFER MILK

To the Editor of THE LANCET

SIR,—In a recent issue (Feb. 13th) Dr. Esther Carling quoted the words of the Minister of Health: "The more the consumption of milk is increased the more important does it become to secure the safety of the supply," and went on to suggest that it is the business of the medical practitioner to coöperate with the health authorities to ensure the prevention of milk-borne disease. Although agreeing with Dr. Carling's suggestion, I doubt if many practitioners know how the milk trade is carried on in a rural area or if they realise the many difficulties met with in the production of a first-class supply. Let me describe the methods of production and supply in the small area of the agricultural county in which I practise.

A Milk Distributing Depôt.—There has recently been established in the neighbouring small industrial town a milk depôt, to which milk is brought by lorries in churns from many of the surrounding farms. A sample of the milk is tested and the remainder is strained, pasteurised, and dispatched to London in clean churns. Some of the milk is kept to separate into cream and for the making of butter. Broadly speaking none of the milk, cream, or butter is consumed locally. This depôt is well organised.

A Large Scale Farmer.—A farmer who has several hundred head of cattle deals directly with London through his bailiff; in his case the milk is only chilled. From time to time his herd of cattle is inspected for tuberculosis. The standard of efficient organisation there is poor. In a similar fashion another farmer collects and distributes his milk to the city of Oxford.

A Small Scale Farmer.—An extremely industrious and hard-working couple have about fifty head of tuberculin-tested cattle; with the help of one assistant they run the farm and distribute the milk themselves. The milk is chilled and delivered by a small motor-van, twice daily, to the inhabitants of the small local town. This small concern is exceedingly well run, and it seems a pity that most of the profits are swallowed up in bad debts.

A Milk Collector and Purveyor.—Two men collect all the milk produced by a local farmer from a herd of tuberculin-tested cattle. The milk is chilled and is taken out on a morning and evening round in churns by a horse-drawn milk float. These men are tireless workers, spending their entire lives collecting and distributing milk locally. In spite of their labours they find it difficult to make a living owing to the usual bad debts and the comparatively small amount of milk consumed by the average rural and small-town householder.

Milk Shop Purveyors.—There is a shop in the small town to which all milk is brought in churns by rail from the nearest large town and is bottled on the premises. A second purveyor has all his milk brought from London by rail daily; he is one of the few men who sells tuberculin-tested milk.

Other Sources.—One or two queer old men drive about from village to village in decrepit horse-drawn carts. On the tail-board reposes a remarkably battered-looking churn filled with milk from local farms. This they retail in surrounding villages.

There are some interesting points about these arrangements. It is, for instance surprising that a large number of consumers in the country obtain their milk from London or from one of the large towns, even when the source of supply is almost at their door. The milk thus obtained is usually better prepared but must lack something in freshness, as is proved by the frequency with which it goes sour in summer. It is also surprising that the consumption per head of the population is so small, a delivery of one to one and a half pints being the usual daily order for a family of two adults and three children (not infants). Free milk is distributed at the senior school in the town but not at the junior school. Some of the village schools also provide free milk, although the mothers often object as they consider it "takes the child off his food at dinner-time."

On questioning the producer farmers about the Milk Marketing Board and its effect on their trade one generally hears the black side of the financial position and one cannot but realise that milk is produced at about the lowest possible figure consistent with making a reasonable living. The collector and the purveyor tell the same story, and no one who has had the opportunity of studying them at close quarters can fail to recognise how extremely hard they have to work. A seven-day week is inevitable with no holidays, not even Christmas day off. My own experience shows that their health suffers as the result of this perpetual strain.

Before one can fairly talk about "more and safer milk," or insist that the further improvement in the milk-supply is the duty of medical practitioners, we must take an unbiased view of the difficulties of the field worker striving to make a living out of the milk trade. Personally I fail to see how we can expect further improvement without readjustment in the financial balance between producer, retailer, and customer. Exactly how this can take place is the real problem. Can it be effected by or through the Milk Marketing Board or must the consumer pay

for, and probably consume less of, a safer cleaner milk?

The present-day farmer or retailer as I know him is a knowledgeable man and is fully aware of the need for cleaner milk and of the methods for obtaining it, but he simply cannot bear the expense of these methods unless he is a philanthropist or is prepared to go into the bankruptcy court.

I am, Sir, yours faithfully,

March 15th. LIEUT.-COL., I.M.S. (retd.).

INFLUENCE OF SCHOOL ROUTINE ON GROWTH AND HEALTH

To the Editor of THE LANCET

SIR,—The interesting article by Mr. John Allan in your last issue bears out the conclusions reached from a research carried out by the National Council for Mental Hygiene in 1931, which were embodied in a pamphlet entitled "School Life and Nervous Instability" published by the council.

Thirty-nine schools of every type, covering the ages from 5 to 18 and with a total population of 10,125 children, were approached with a view to finding out the effects of the conditions of school life on the physical and mental health and development. It was found that the maximum period of strain occurred during adolescence and that retardation in growth as evidenced by height and weight tended to occur during the summer term, especially when examinations and school sports added to the child's burden. This period also appeared to coincide with an increase in punishments, which may also be regarded as evidence of an increase of emotional instability in the children and possibly in the teachers. The returns appear to show two periods of maximum instability, one occurring at puberty and one between 16 and 17.

Evidently a careful recording of height and weight is extremely important and we agree with Mr. Allan that it is a matter for regret that the Board of Education medical authorities are basing their estimates of nutritional states on clinical observations only, without regard to the standards of height and weight for age.

The whole question of the school curriculum, as regards both work and play in relation to the growing child, requires much more attention than it has hitherto received, since damage done during the years of growth, and especially between the years of 12 and 18, can never be retrieved.

We are, Sir, yours faithfully,

DORIS M. ODLUM,
GEORGE SOMERVILLE,
Joint Honorary Secretaries, National Council for Mental Hygiene.

Chandos House, Palmer-street, London, S.W., March 16th.

NITROUS OXIDE ANALGESIA IN OBSTETRICS

To the Editor of THE LANCET

SIR,—I read the paper in your last issue by Dr. Chassar Moir with much interest. For some years before gas-and-air machines were introduced I made use of pure nitrous oxide gas during labour with satisfactory results, and in a letter to your columns (*Lancet*, 1931, **2**, 427) I described a simple, light, portable apparatus with reducing valve, automatic filling valves for the bag, and a self-administering stop-cock. Dr. Ivan Magill and Messrs. Charles King Co., Ltd., had helped me to construct it.

The apparatus described by Dr. Chassar Moir is an improvement on this as it could be entrusted to midwives. A self-administering stop-cock was awkward. The new face-piece with expiratory valve is much more convenient for patients.

I am, Sir, yours faithfully,

Plymouth, March 14th. JAMES RIDDELL.

FACING THE DIPHTHERIA PROBLEM

To the Editor of THE LANCET

SIR,—In the reference to the initiation of diphtheria immunisation at Markfield in your last issue (p. 664) there is one slight inaccuracy. It is stated that I and the doctors associated with me considered 50 per cent. of "consents" would be sufficiently high to prevent epidemic prevalence. What I actually stated was that anything under 50 per cent. would probably render the procedure not worth attempting. This, of course, is a very different thing.

You will, I am sure, be glad to know that we have succeeded in immunising about 90 per cent. of the children and to have accomplished this in a large industrial village in Leicestershire, the Mecca of the antivaccinationists, is I submit a remarkable achievement.

I am, Sir, yours faithfully,

T. W. GORDON KELLY,
March 15th. M.O.H., Market Bosworth Rural District.

ANOREXIA NERVOSA

To the Editor of THE LANCET

SIR,—Dr. Sheldon's article in your issue of Feb. 13th and the comment by Sir Walter Langdon-Brown, Dr. William Sargant and Dr. W. S. Maclay, are of extreme interest, and show a serious effort by the medical profession to remove further the stigma of neurosis from patients presenting evidence of a major metabolic breakdown. That such metabolic disorders can be of endocrine origin, because of a metabolic control possessed by the anterior pituitary gland, has been indicated by Dr. Sheldon. Recent experiences with two fatal cases, both of which presented the clinical features of anorexia nervosa, clearly indicate the seriousness with which some of these cases must be viewed.

Both cases suddenly developed coma, which lasted about 36 hours in spite of hypoglycæmia therapy, and was terminal. In both cases the level of blood-sugar in coma was 20 mg. per 100 c.cm. of blood. Administration of intravenous glucose and adrenaline failed to rouse these patients beyond a semi-stuporous state, and the maximal rise of blood-sugar under therapy was below 60 mg. per 100 c.cm. of blood. The post-mortem in the female aged 24, diagnosed Simmonds's disease (anorexia nervosa, however, had been the diagnosis for the past five years), showed atrophy of the pituitary and an enlarged pancreas. Prof. Rasmussen studied the pituitary gland and reported atrophy in size and weight to 50 per cent. of normal, and microscopically extensive atrophy and degeneration of the anterior lobe.

The second case, a female aged 56, was admitted in coma, and presented the typical appearance of anorexia nervosa. The post-mortem revealed a normal pituitary gland macroscopically and on cross-section, a normal size pancreas, and extensive macroscopic hæmorrhage in both adrenal glands. The microscopic study of the adrenal showed practical destruction of all cortex tissue by hæmorrhage. The pituitary gland was not studied microscopically because it was mislaid by an attendant.

The sudden terminal events in two out of my seven cases presenting the clinical type Simmonds's disease, or anorexia nervosa syndrome, indicate to me that one must be very careful to understand the vague symptoms of hypoglycæmia, for they can

be assigned to a neurotic background. Later investigation of my two fatal cases established the fact that both individuals had experienced the neurotic and psychic symptomatology of hypoglycæmia for five years preceding the fatal attack. Sir Walter Langdon-Brown has indicated the vagaries of blood-sugar studies. We have much to learn concerning blood-sugar in the human, as indicated by Goldzieher (*Endocrinology*, 1936, 20, 86) demonstrating six types of sugar-tolerance curves in endocrine cases with a hypoglycæmic syndrome.

A small series of patients administered Collip's adrenotropic factor indicate the possible rôle of this substance in blood-sugar control. One patient has had a plateau type of sugar-tolerance curve, determinations made six months apart, with corresponding symptomatology. Following the administration of 1 c.cm. of Adrenotropic Hormone (Collip) three times a week, a pre-diabetic sugar curve and glycosuria (first- and third-hour specimens) appeared.

I share the hope with other of your correspondents that critical studies, as suggested by Dr. Sheldon, of these cases will be made before the "neuro" tag is wired on a possible medical casualty.

I am, Sir, yours faithfully,

Philadelphia, March 3rd. CHARLES W. DUNN.

ON THE TAKING OF CHILDREN'S TEMPERATURES

To the Editor of THE LANCET

SIR,—There are three ways of taking the temperature: in the mouth, in the rectum, and in the axilla or groin. Each method has its own special advantages and advocates. Personally, I suggest that taking the temperature in the groin or axilla is the soundest and safest method.

The advantage of the rectal method is that in tiny infants it is quick and easy. There is no danger of breaking the thermometer. The disadvantage is that it is one degree higher than the normal, and once the nurse or mother has seen the thermometer register at 99·4°, no amount of argument can make her feel that the temperature really is normal. She has a subconscious feeling that the child must be ill. Another very real disadvantage is that when a tiny infant's temperature is taken rectally several times daily, the thermometer acts as a stimulus to the anus, just as a soap stick or tip of the little finger would in a constipated infant, so that after the removal of the thermometer the infant tends to pass a motion, and diarrhœa can actually be provoked in an infant by frequently taking the rectal temperature. Last, and not least, infections may be transferred from one child to another, or from outside sources, into the anus, and strong antiseptic solutions, unless carefully wiped off, may actually do considerable damage. Everything taken into consideration, the habit of taking the temperature of infants and young children rectally is to be deprecated.

Taking the temperature by mouth is impossible in the tiny infant with any degree of safety, but in the older child it has the advantage of being quick and accurate. On the other hand, the danger of the child biting the thermometer is a very real one. There is also a very real risk of transferring infection from child to child, or from adult to child, depending on who last used the thermometer; antiseptics may not be efficient in sterilising the thermometer after use. Taking children's temperatures by mouth is not, in my opinion, to be recommended.

The axillary or groin temperature is the method of choice, although it takes longer. The thermometer should be left in place for five full minutes, and tends, when the child is healthy, to be perhaps half a degree too low. When a child is ill for any reason, the skin temperature as a rule approximates to the mouth and rectal temperature to within two-tenths of a degree. This is a negligible error. No infection can be conveyed in this fashion. The infant can be held on the mother's or nurse's knee, with the thermometer tucked into the groin or under the arm, and it can be nursed until the thermometer is read. In older children who are lying in bed it is easily placed in position. The risk of breaking the thermometer, in my experience, is very small, and altogether this method is preferable. Psychologically, the effect of taking the skin temperature, rather than the mouth or rectal temperature, and finding it on the low rather than the high side in health, is of great advantage, and the over-anxious mother or nurse can feel quite happy and sure that the child has no fever.

I am, Sir, yours faithfully,

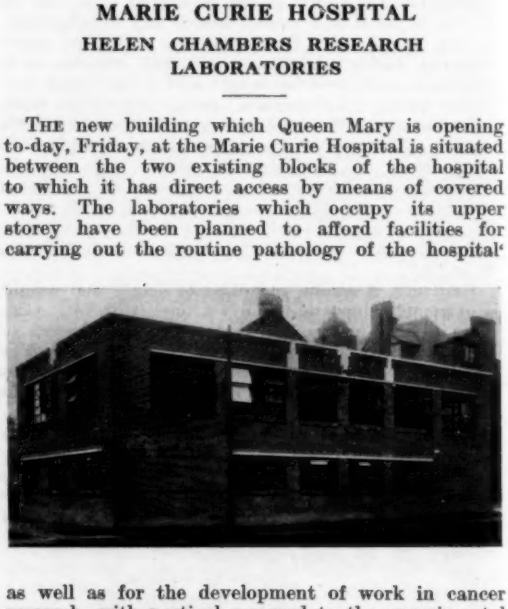
DONALD PATERSON.

Devonshire-place, W., March 16th.

MARIE CURIE HOSPITAL

HELEN CHAMBERS RESEARCH LABORATORIES

THE new building which Queen Mary is opening to-day, Friday, at the Marie Curie Hospital is situated between the two existing blocks of the hospital to which it has direct access by means of covered ways. The laboratories which occupy its upper storey have been planned to afford facilities for carrying out the routine pathology of the hospital



as well as for the development of work in cancer research, with particular regard to the experimental approach. One laboratory is equipped for routine clinical pathology and histology. Separate rooms are provided for bacteriology and for biochemistry. Two rooms are equipped to house animals for work in experimental pathology and the pathologist's private room is also fitted as a research laboratory. A sterilisation room and a room for the preparation of media and a mess room for the technical assistants complete the unit, which is in charge of Dr. Mary Gilmour under the general direction of Dr. Elizabeth Hurdon.

KEIGHLEY VICTORIA HOSPITAL.—It is proposed to build a new operating unit, with two theatres, and a block of five children's wards at the south-west corner of this hospital. It is estimated the extension will cost about £15,000.

OBITUARY

FREDERICK WILLIAM ALEXANDER, O.B.E., M.R.C.S. Eng., L.R.C.P., L.M. Edin., D.P.H.

Dr. Frederick Alexander, who died on March 14th at his home in Teddington, was widely known for sanitary labours and his keen interest in many questions of public health. He entered St. Bartholomew's Hospital as a medical student in 1877, and qualified as M.R.C.S. Eng. in 1881, taking the Edinburgh diplomas later. After qualification he served for a term as a surgeon on H.M.S. *Dunkeld*; later he was assistant medical officer at the Mile End-road Infirmary, and was then appointed medical officer of health to the borough of Poplar, a post which he filled with conspicuous success for 34 years, gaining well deserved popularity for his close attention to public welfare. A careful executive officer, he made special reports on the prevalence in his dispensation of infectious diseases, and made close inquiry into the quality and value of different foodstuffs, and into the purity of many substances in common use, cosmetics, and tobacco. He wrote on these subjects forcibly. He came into prominent notice by his insistence upon the danger consequent on the uncleanliness of the water in public baths. He instituted at Poplar an electrolytic disinfectant plant for the purification of the swimming-bath water, an innovation which subjected him to considerable criticism. But there is no doubt that he was a pioneer in the movement which led to the interference of the Ministry of Health and the laying down of regulations for ensuring that the water in public baths should be kept pure in accordance with scientific direction. His interest in the baths led him to the invention of an ingenious device for teaching the young to swim. The occurrence of an epidemic of small-pox during his term of office led to particular attention to the prevention of blindness among the infant patients, while special reports issued by him on the relationship of vitamins to foodstuffs and on artificial light treatment showed his resolution to keep abreast of modern therapeutics. On his retirement from office he received the O.B.E.

About ten years ago he went to live at Teddington, where he continued to manifest his wide interest in practical hygiene, while he made a special study of the needs of the blind, devoting to the subject much time and attention. He made useful innovations in the methods of instruction in Braille characters, which enabled the sighted instructor to more readily instruct the students, and he constructed models for teaching the blind the elements of electricity and magnetism. He was a skilled mechanician and he adapted a large number of games and puzzles in such a way that they became practical recreations for the blind; models of these were reproduced in large numbers through the voluntary coöperation of amateur woodworkers, and the results were distributed free of charge.

Dr. Alexander was a very able and energetic man. His inspiration throughout a full and active life was always the same—to be of service to his fellows. He had reached his 78th birthday a few weeks before his death.

EDWIN JAMES WENYON, M.B., B.Sc. Lond.

Dr. Edwin Wenyon, who died on Feb. 20th after little more than a day's illness, at the age of 84, had practised in Dundee for 36 years. As a student, first in Edinburgh, then in London, he had a brilliant career. His London B.A. was followed by the B.Sc. degree with honours in experimental physics. He won the science entrance scholarship to Guy's Hospital and the Sands Cox exhibition in physiology. In the second M.B. examination he was awarded the gold medal in anatomy and honours in physiology. After serving as house surgeon at Guy's and some experience at the Rotunda, Dublin, he went as officer of health to the Orkneys, "For a brief term only" he said; but the wild islands of the North laid their spell on him and many years passed before he came away. He then spent a short time in his native county of Staffordshire and settled finally in Dundee. His interests were many and diverse. A wide reader in his own language, in French and German, he was a capable and vivid critic of men and events the world over. In his earlier days farming and agricultural chemistry attracted him; he found time to grow melons and black oats and carnations He was the first in the Orkney Islands to succeed in growing strawberries in the open air. At one time he had a fernery in which was a specimen of every British fern. Riding was for many years a favourite exercise; he broke in himself several horses for his own use. He was also a great walker and keen fisherman. A true lover of Nature, the familiar open two-seater in which he made his rounds was a proof of his inveterate love of the open air. In his prime he could defy any challenger at chess.

No hobby or sport however roused in him such absorbing interest as did children—well or ill. He waged constant war on errors of diet whether the result of ignorance, carelessness, or poverty. Associated with a wide experience and clinical skill were other qualities which gave to this man of undoubted genius a remarkable and lovable personality. His unfailing kindliness, his cheerfulness and gaiety of mien radiated hope and courage. As one of his friends has said, "To a multitude of young and old he was more than their doctor, he was their understanding friend." His quick yet kindly wit made him in any company a dominant personality. He revelled in a grand argument, and with his elder brother, the late Dr. Charles Wenyon, had many an intellectual battle. A tale is told of Edwin Wenyon in the heat of argument tearing off his coat and shouting to his brother: "keep cool." In his long life he had his full share of trouble; but with an incorrigible optimism he refused to worry, and at 84 retained the unlined countenance of a much younger man, while his eyes never lost their whimsical suggestion of the fun there might be in living.

He leaves a widow, and of his thirteen children ten, three sons and seven daughters, survive him. The eldest son is head chemist with Imperial Chemical Industries Ltd., Huddersfield. Another son, Dr. Edwin J. Meredith Wenyon, has been with his father in Dundee for six years and will carry on the practice.

JOHN LIDDELL, M.D. Edin.

Dr. John Liddell, who died on Feb. 28th after a brief illness, while on holiday in Portugal, was for many years a well-known figure in the medical circles of Harrogate. Qualifying M.B., C.M. at Edinburgh in 1882, he had already tasted of scientific exploration in the pathological laboratory during the progress of research there for the causative organism of tuberculosis. Koch, however, was first. After practising in Winchester for some years he moved to Harrogate in 1891, having obtained M.D. Edin.

(Hons.) in the previous year. A monograph on the waters of Harrogate appeared from his pen in 1893, and his publications thereafter showed that his interests were in dermatological and rheumatic conditions. He became hon. physician to the Royal Bath Hospital at an epoch when pathological laboratories were unheard-of luxuries, and the physician had to struggle to obtain a tiny pantry, furnished with his own microscope. In result, most of the section-cutting was done at home. He was also hon. physician to the convalescent home of the Sunderland infirmary. In the new century he began to be interested in colonic lavage, and was instrumental in getting the corporation baths fitted with appropriate appliances, thereby earning the gratitude of many sufferers. He remained to the end a firm believer in the Harrogate treatment and was a striking exemplar of its benefits.

Dr. Liddell was a member of the Harrogate Golf Club from its inception, having been a pioneer of golf in England in the days when players were glad to have for a course a field or two with a few holes dotted about to suit the convenience of the farmer. Curling, too, when winters were winters, was a pastime which he introduced to Harrogate clubs. Retiring some seven years ago, he eventually settled in Wiltshire only last summer. He leaves a widow and a younger son, who is lecturer in physiology at Oxford and a fellow of Trinity College. His elder son, a lieutenant in the 60th Rifles, died of wounds in 1916.

ARCHIBALD FAIRLIE, M.D. Glasg.

THE death occurred at the end of February of Dr. Archibald Fairlie after a brief illness. He received his medical education at the University of Glasgow, where he graduated as M.B., C.M. in 1889, proceeding in the following year to the doctorate. He held resident appointments at the Western Infirmary, Glasgow, and at the Maternity Hospital, Glasgow, and practised for a time at Bebside, his connexion spreading to Blyth. He was a promoter of all benevolent and charitable work in the Blyth area, was a prominent member of the British Medical Association, and worked hard in connexion with the St. John Ambulance Association. The public value of his services was recognised by his being appointed a J.P. for the county of Northumberland. Dr. Fairlie was an excellent clinical physician taking all pains to keep up with modern work, while apart from his professional interest he was a well-known authority on the history of his neighbourhood. His death at the age of 72 is a loss to all classes. He was a widower and leaves two sons, both of whom are in the medical profession.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED MARCH 6TH, 1937

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 1652; diphtheria, 1087; enteric fever, 41; pneumonia (primary or influenzal), 1256; puerperal fever, 38; puerperal pyrexia, 122; cerebro-spinal fever, 25; acute poliomyelitis, 2; acute polio-encephalitis, 1; encephalitis lethargica, 1; dysentery, 15; ophthalmia neonatorum, 85. No case of cholera, plague, or typhus fever was notified during the week.

Notifications of acute pneumonia were still much below expectation: in London 56 per cent. below; in the country as a whole 26 per cent. below.

The number of cases in the Infectious Hospitals of the London County Council on March 12th was 3307, which included: Scarlet fever, 875; diphtheria, 1048; measles, 25; whooping-cough, 592; puerperal fever, 19 mothers (plus 11 babies); encephalitis lethargica, 282; poliomyelitis, 2. At St. Margaret's Hospital there were 17 babies (plus 6 mothers) with ophthalmia neonatorum.

Deaths.—In 122 great towns, including London, there was no death from small-pox or from enteric fever, 10 (0) from measles, 4 (2) from scarlet fever, 21 (8) from whooping-cough, 35 (8) from diphtheria, 58 (26) from diarrhœa and enteritis under two years, and 181 (36) from influenza. The figures in parentheses are those for London itself.

Of the 145 deaths from influenza in the 122 great towns of England and Wales outside Greater London the largest totals were reported from Birmingham 13, Liverpool 9, Manchester and Sunderland each 8, Newcastle-upon-Tyne 7, Gateshead 6, and Norwich 5.

Hull reported 3 deaths from measles, Stoke-on-Trent 2. Fatal cases of whooping-cough were scattered over 14 great towns; Liverpool reported 3. Fatal diphtheria was reported from 25 great towns: 4 from Gateshead, 3 from Birmingham.

The number of stillbirths notified during the week was 281 (corresponding to a rate of 41 per 1000 total births), including 42 in London.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

IN the Abstract of Navy Estimates for 1937 the Medical Establishments and Services are estimated at £482,160 gross and £411,400 net. For 1936 the estimates were £467,330 gross and £397,300 net.

ROYAL NAVAL VOLUNTEER RESERVE

Proby. Surg. Lt. R. A. Mogg to be Surg. Lt.

In the Abstract of Army Estimates, 1937, the Medical Services are estimated as follows: gross, £1,107,000; net, £1,055,000.

ROYAL ARMY MEDICAL CORPS

Officers who wear spectacles when on duty, states a new Air Ministry Order, are responsible for providing themselves with a pair having the approved type of flattened side-pieces which do not interfere with the wearing of a respirator. Such frames can be readily obtained from optical firms.

In the Abstract of Air Estimates, 1937, the Medical Services are estimated as follows: gross, £466,000; net, £439,000. The figures for the year 1936 were: gross, £405,000; net, £382,000.

INDIAN MEDICAL SERVICE

The following officers have assumed appointments in India: Col. J. O. Andrews, D.S.O., Deputy Director of Medical Services, Northern Command (confirmed from officiating appointment); Lt.-Col. G. Wilson, O.B.E., M.C., D.A.D.M.S. (Mobilisation), Northern Command (confirmed from officiating); and Maj. R. Murphy, D.A.D.M.S., Waziristan District.

Lt.-Col. J. G. Gill, D.S.O., O.B.E., M.C., Asst. Director of Hygiene and Pathology at Army Headquarters, will be on leave in China and Japan from March 15th until the middle of May.

The undermentioned officers have vacated appts. in India:—

D.A.D.M.S.—Lt.-Col. P. S. Tomlinson, D.S.O., R.A.M.C.
D.A.D.H.—Maj. J. D'A. Champney, R.A.M.C.
D.A.D.P.—Maj. F. J. Hallinan, R.A.M.C.

The undermentioned appts. have been made in India:—

D.A.D.M.S.—Maj. R. Murphy, R.A.M.C.
D.A.D.H.—Maj. F. Harris, M.C., R.A.M.C.
D.A.D.P.—Lt.-Col. A. C. Craighead, I.M.S.

Indian Medical Department.—Asst. Surg. (1st Cl.) F. G. Whitbread to be Lt. (Sen. Asst. Surg.). Maj. (Sen. Asst. Surg.) W. G. H. Warner and Lt. (Sen. Asst. Surg.) S. C. Gomez retire.

COLONIAL MEDICAL SERVICE

Dr. W. A. C. Hortor has been appointed Medical Officer, Cayman Islands, and Dr. J. I. Rerrie Medical Officer, Jamaica. Dr. J. Portelly and Dr. W. Young become Medical Officers, Superscale Grade A, Malayan Medical Service; Dr. J. H. Bowyer and Dr. J. C. Carson become Medical Officers, Superscale Grade B, Malayan Medical Service; Dr. J. A. A. Duncan becomes Assistant Director of Medical Service, Nigeria; Dr. L. W. Fitzmaurice Medical Officer and Bacteriologist, Bahamas; and Dr. F. W. Vint, Senior Pathologist, Kenya.

PARLIAMENTARY INTELLIGENCE

NEW ARMY REFORMS

IN committee of supply on the Army Estimates on March 16th Mr. DUFF COOPER, Secretary of State for War, said that recruiting for the Territorial Army had increased steadily throughout the year. In spite of the numbers who had necessarily left during the year the force to-day was stronger by 861 officers and 15,295 other ranks than it was a year ago. Unfortunately, while recruiting had improved, establishments had had to be increased as a result of the creation during the year of the 2nd Anti-Aircraft Division and of the expansion of the 1st Aircraft Division. The completion of these divisions and the provision of anti-aircraft defence for certain ports would add further to the establishments. The total increase amounted to over 20,000 men as compared with last year, and therefore though the strength had been increased by over 16,000, the Territorial Army was nevertheless further off from getting up to establishment than it was a year ago. But they need not be discouraged by these figures. So far as the Territorial Army was concerned, they were undoubtedly in a "rising market." Great numbers of young men of the very best type were coming forward to join the anti-aircraft divisions.

It had been decided to restore to the Territorial Army Associations the 2½ per cent. cut on all grants which was introduced as an economy measure in 1928. This year a considerable increase in the training grant was to be made. The cadet movement would no longer be dependent on private charity, and similar financial assistance would be given to it in future as it enjoyed in the past before recognition was withdrawn. Recruiting for the Regular Army during the year had been worse than in the previous one. It was of urgent importance that there should be a very substantial improvement, for otherwise the Army would no longer be able to carry out its normal duties of furnishing garrisons required for maintaining peace and order throughout the British Empire.

A number of reforms would be introduced in the ordinary curriculum of army life which Mr. Duff Cooper hoped would increase the popularity of the Service. The soldier's ration was to be increased to allow of four meals a day instead of three as hitherto. At home stations an ounce of butter would be substituted for an ounce of margarine, and the butter would be supplemented by half an ounce of margarine. The daily ration of enlisted boys would be increased by an issue of milk or in other suitable ways. It had also been arranged that men living in married quarters, or unable for other reasons to feed in mess, should receive a sufficient allowance of food or money to ensure that they would enjoy the same scale of nourishment as that of their fellow soldiers. Every effort was being made to improve the conditions of accommodation. New barracks would include sleeping, dining, and ablution facilities. Sitting-rooms would be provided; hot and cold water laid on to every floor, central heating throughout, and arrangements were being made for increases in fuel scales. So far as possible similar amenities were being extended to existing barracks, and married quarters were being brought up to the best housing standards of the day.

NOTES ON CURRENT TOPICS

Factories Bill in Committee

THE Factories Bill was further considered by a standing committee of the House of Commons on March 9th and 11th.

Clause 6 (which provides for the drainage of floors in workshops) and Clause 7 (which requires the provision of sanitary conveniences) with minor amendment were agreed to.

DUAL CONTROL

On Clause 8 (which provides that certain health provisions of the Bill shall be enforced by district councils as respects any factory in which mechanical power is not used) Mr. H. GRAHAM WHITE said there was anxiety in the minds of some members with regard to the principle of dual control of factories. Where a district council might not have a sufficient staff for inspecting works there would be a different standard. It would be better if the whole responsibility was in the hands of the Home Office inspectors.—Mr. R. J. DAVIES said that under the present proposals it was possible for a small factory with a small staff using mechanical power to be under the inspection of a Home Office inspector, whereas a much larger factory where no mechanical power was used would be under the control of the district council.—Mr. MANDER said there were parts of the country where there might be large works and a local council who might find themselves in a difficult position if called upon to take action against their personal or business friends. In cases of that kind it was only the Home Secretary who could act with the necessary strength.—Sir J. HASLAM suggested that the difficulty concerning dual control was covered by Clause 9.—Mr. L. SILKIN, Mr. W. A. BURKE, and Mr. A. HOLLINS urged that the clause should be reconsidered.—After further discussion, Sir J. SIMON said he hoped that when the Bill became law there would be a substantial increase in the number of factory inspectors and he wanted to use the additional staff to the best purpose. There were some kinds of work which a Home Office factory inspector could do best and which nobody else could do. In one sense there was dual control as suggested, but the local authority and the factory inspector did not exercise their control at the same place and time and in that sense there was no dual control. He would further consider the matter and see whether there was anything which could properly be done. The committee should have regard to Clause 9 with its provision for action by an inspector in default of a local authority.

On Clause 9 Mr. SHORT moved an amendment to give power to an inspector, where he was satisfied that no proceedings had been taken by a district council for punishing or remedying an act or default, to take proceedings and recover from the district council summarily as a civil debt all expenses incurred in successful legal proceedings and not recovered from any other person. The principle applied not only to factory and workshop inspection, but also to housing accommodation and to tenants who had not been able to obtain their rights owing to the vicious opposition of property owners and some ratepayers.—Mr. R. S. HUDSON, Parliamentary Secretary, Ministry of Health, opposed the amendment.—Mr. R. J. DAVIES said there were some local authorities who would not move and others who moved so slowly that there could easily be an epidemic among employees in the meantime.—The amendment was negatived by 28 votes to 15.

Clause 10 (which empowers the Home Secretary, in certain circumstances, to authorise an inspector to act in default of a district council) was agreed to.

MEDICAL SUPERVISION

On Clause 11 (medical supervision), which provides that where it appears to the Home Secretary that illness has occurred in a factory which is believed to be due to a process or other conditions of work, or that because of changes in a process there may be risk of injury to the health of persons employed, or that young persons are employed in work which may cause such risk of injury, he can make special regulations requiring reasonable arrangements for the medical supervision (not including medical treatment) of persons, or any class of persons, employed

there—Mr. ELLIS SMITH moved the deletion of the words "not including medical treatment." The Bill, he said, did not conform to modern standards with regard to silicosis, lead poisoning, dermatitis, and several other industrial diseases. It was not the fault of the employees that they contracted those diseases. —Sir J. SIMON said that the clause was doing something entirely new in factory law. It was a clause which they could take some pride in, but it was not altogether reasonable to ask that an employer should bear the cost of the medical treatment of an employee. There was national health insurance and elaborate arrangements in the matter of medical treatment were made by trade-unions. He was, however, prepared to modify the clause.—The amendment was withdrawn and the clause agreed to with substitution for the words "not including medical treatment" of the words "not including medical treatment other than first-aid treatment and medical treatment of a preventive character."

Clauses 12, 13, and 14, tightening up the provisions for safeguarding machinery by fencing, were agreed to.

QUESTION TIME

THURSDAY, MARCH 11TH

Alcohol and Road Accidents

Mr. RICHARD RUSSELL asked the Home Secretary whether, in view of the probable heavy increase of motor traffic during the period of the Coronation festivities, he would, by circular or otherwise, draw the attention of the magistrates to the great increase of road accidents at festive seasons, when, as last Christmas, added drinking facilities were permitted, and recommend the closest scrutiny of the claims for lengthened hours of drinking during the Coronation celebrations, especially at times when larger crowds at a later hour of the day made caution on the roads specially necessary.—Sir JOHN SIMON replied: I feel sure that magistrates will not fail to take into account all relevant points when considering applications for such extensions during the Coronation festivities. The limited extensions which have been granted on similar occasions in the past are not, I am informed, shown to be the cause of increased accidents.

Children Born in Prison

Mr. ANDERSON asked the Home Secretary how many children were born in His Majesty's prisons; and how many, if any, expectant mothers were released for their children to be born outside, for the 12 months ended December, 1936.—Sir JOHN SIMON replied: During 1936 the numbers were 16 and 10 respectively.

Hospital Staffs and Anti-Gas Instruction

Mrs. TATE asked the Home Secretary what arrangements, if any, were being made by his department to send instructors and apparatus to hospitals, in order that hospital staffs might become proficient in the use of gas masks and the necessary steps to take in the event of war.—Mr. GEOFFREY LLOYD, Under-Secretary, Home Office, replied: Sixteen medical instructors have been appointed who are giving instruction in anti-gas precautions to medical practitioners, nurses, and medical students. Up to the end of last month 3059 doctors, 2459 nurses, and 569 medical students had been trained. Arrangements are made through the British Medical Association, the College of Nursing and the medical schools respectively, and the instruction is often given at a hospital.

Mrs. TATE: In the event of a doctor in charge of a mental hospital who has taken steps to make himself efficient in the use of masks applying for permission to instruct a certain number of his staff, would that permission be given to him?

Mr. LLOYD: It would be given in any event.

Mr. BELLENGER: Is it the intention of the Government to centralise instruction mainly in the Home Office School?

Mr. LLOYD: In regard to medical training these doctors are stationed at the various key points throughout the country.

Mr. CREECH JONES asked the Home Secretary what steps, if any, H.M. Government intended taking to see that the gas masks for sale in this country conformed to the Home Office specifications.—Mr. GEOFFREY LLOYD, Under-Secretary, Home Office, replied: A procedure has been arranged under which private manufacturers may be licensed to affix a Home Office certification mark to respirators of their own or Government design, which comply with a Government performance specification. Under this procedure manufacturers are required to submit specimens for examination and a test of performance. If the article is satisfactory a licence is granted to affix the Home Office certification mark. This licence remains in force for six months and thereafter until brought to an end by the Government. The process of manufacture, the components of respirators and completed respirators are subject to Government inspection.

Women and Young Persons and the Two-Shift System

Mr. HOLLINS asked the Home Secretary whether he would consider the publication at his earliest convenience of a list of firms, and their location, working the two-shift system under the Employment of Women and Young Persons Act, 1936, showing, respectively, the two-shift orders which had not been used during a period of two years and thereby expired, the orders which had not been operative during a period of one year which might be revoked, and other orders remaining in force; and whether he would consider the publication of such a list at least once a year.—Sir JOHN SIMON replied: The factory inspectors have been instructed to collect information as regards existing orders for the first six months of this year. When their reports are received, I will consider the points raised by the hon. Member.

Perishable Foods

Mr. HERBERT WILLIAMS asked the Minister of Health what steps he was advising the local authorities to take to avoid food-poisoning in those districts where the suitable or sufficient temperature of shops had been fixed so high that there was a danger of the bacteriological infection of perishable foodstuffs.—Sir KINGSLEY WOOD replied: In deciding what temperature is suitable and sufficient it is for the local authorities to have regard, inter alia, to the nature of the goods sold in the shop, and I have no reason to suppose that they are not alive to the importance of this consideration.

Approved Societies and Additional Benefits

Mr. JAMES GRIFFITHS asked the Minister of Health the average cash value of the additional benefits provided by approved societies under the National Insurance Acts; and what was the highest and the lowest additional benefit so provided by approved societies.—Sir KINGSLEY WOOD replied: I assume that the hon. Member refers to statutory rates of sickness, disablement, and maternity benefits. The average increase, covering some 70 per cent. of the insured population, is about three units, that is 3*s.* a week in respect of sickness benefit, 1*s.* 6*d.* in respect of disablement benefit, and 6*s.* in respect of maternity benefit. Some approved societies have made no increase, while some of the most prosperous have made an increase of five units and also devoted funds to various treatment benefits.

Private Nursing-homes in Marylebone

Mr. LIDDALL asked the Minister of Health whether he was aware that the London County Council had recently, in collaboration with the Marylebone Council, reviewed and weeded out the private nursing-homes converted from single or adjoining decayed dwelling-houses in the back streets of Marylebone; and if he would call for an report on the results.—Sir KINGSLEY WOOD replied: I have no official information on this subject, but I will communicate with the London County Council and inform my hon. friend of the result.

The Trend of Population

Mr. CARTLAND asked the Minister of Health whether he had set up the committee to investigate the trend of population; if so, what were its terms of reference; who were its members; and whether it was open to receive evidence from outside sources.—Sir KINGSLEY

WOOD replied: The Registrar-General is continuing and extending his investigations and researches into this matter. Consultation is also proceeding so as to secure the coöperation of the committee recently formed under the chairmanship of Prof. Carr-Saunders, and I think at the present stage this is the most useful course to adopt. I will from time to time inform the House of the progress made in this important matter.

Telephone Facilities and Urgent Illness

Lieut.-Colonel WICKHAM asked the Postmaster-General whether he was aware of the difficulties experienced by inhabitants of small villages unprovided with telephone kiosks in cases of fire, sudden illness, and other emergencies; and whether he could see his way to reduce the existing rental of £4 for five years or, alternatively, to spread the total amount over a longer period.—Sir W. WOMERSLEY, Assistant Postmaster-General, replied: I am aware of the difficulties; but they differ in degree with local circumstances, and it is necessary to maintain some fixed standard of discrimination. Under the Jubilee concession kiosks will be provided without special payment in every village or hamlet where there is a Post Office and facilities do not already exist. It would not be possible to provide kiosks in every village or hamlet throughout the country without overloading the finances of the department and delaying other work. Under the tercentenary concession therefore, any village or hamlet can have a kiosk if the local authority, with its special knowledge, regards the local need for a kiosk as sufficient to justify it in paying for a period, limited to five years, a rental of £4, equal to the minimum rental paid annually by a subscriber. I regret that I cannot see my way to reduce the sum or to spread it over a longer period, at any rate during the present heavy pressure of demand upon the department's resources.

The Cost of Living

Mr. SHINWELL asked the Minister of Labour the percentage increase in the cost of living between February, 1935, and February, 1936.—Mr. ERNEST BROWN replied: According to the statistics compiled by my department relating to the cost of maintaining unchanged the pre-war standard of living of working-class families, the average level of the cost of living of such families was approximately 42 per cent. above the pre-war level at 1st February, 1935, and 47 per cent. above the pre-war level at 1st February, 1936. These figures indicate an increase of approximately 3½ per cent. in the cost of living between the two dates.

Cremation

Mr. THORNE asked the Home Secretary how many crematoriums there were in this country; and how many people were cremated in 1937.—Sir JOHN SIMON replied: The number in England and Wales is 29. I have no information as to the number of persons cremated this year, but the total number of cremations in England and Wales last year was 10,188.

MONDAY, MARCH 15TH

Health Insurance: Juveniles and Medical Fees

Mr. RHYS DAVIES asked the Minister of Health when he intended to introduce a Bill to bring into health insurance young persons on entry into employment; whether he had now come to an agreement with the medical profession as to panel fees in respect of such persons; and, if so, what was the amount agreed upon.—Mr. HUDSON, Parliamentary Secretary to the Ministry of Health, replied: My right hon. friend cannot say at present when this Bill will be introduced. The question of the doctors' fees for the young persons referred to has become bound up with the larger question whether the fees now paid for all insured persons call for revision, by way of increase or decrease, and my right hon. friend has agreed with the suggestion of the medical profession that the whole matter should be referred to an independent Court of Inquiry.

Medical Practitioners and Health Insurance

Mr. LYONS asked the Minister of Health if he would state for the years 1935 and 1936 respectively, the number of medical practitioners undertaking national health insurance work in this country; and the total amounts paid for such services out of national health insurance funds.—Sir KINGSLEY WOOD replied: The numbers of medical practitioners under agreement with insurance committees in England and Wales in 1935 and 1936 were 16,552 and 16,700 respectively, and the total amounts paid to them from national health insurance funds in respect of those years were £7,345,338 and £7,728,000. The last-named figure is approximate, as the returns of expenditure are not yet complete.

Children and Inflammable Cinema Films

Mr. SIMMONDS asked the Home Secretary what action he proposed to take to prevent the sale of inflammable cinematograph film to children.—Sir JOHN SIMON replied: This is a difficult matter which has been receiving much consideration, and I should be glad to discuss the question with my hon. friend.

Milk Adulteration

Mr. DAVID ADAMS asked the Minister of Health whether he was aware that cases in recent prosecutions by the Newcastle Corporation, under the Food and Drugs (Adulteration) Act, 1928, Section 16 (2), of vendors selling new milk deficient in non-fatty solids 17·2 per cent. and 15·4 per cent. respectively, were dismissed by the magistrates; and whether, as deficiencies on this scale indicated the presence of added water, he would consider legislation for the more adequate protection of the public in this matter.—Mr. HUDSON replied: My right hon. friend was not previously aware of these cases, but he has now received a communication from the town clerk with regard to them. My right hon. friend is making further inquiries and will communicate with the hon. Member when these are completed.

Diphtheria in Huddersfield

Mr. GROVES asked the Minister of Health how many cases of diphtheria had been recorded in Huddersfield in children who had been immunised against that disease; and whether there had been any deaths in immunised children during the period in which immunisation had been practised.—Sir KINGSLEY WOOD replied: I have been in communication with the local authority and the following is the information which they have furnished on this subject: Approximately 50 per cent. of the children of Huddersfield have been immunised to protect them against diphtheria. During the past four years amongst the 50 per cent. not treated by immunisation there were 1138 cases of diphtheria, resulting in 133 deaths. During the same period amongst the 50 per cent. treated by immunisation there were 40 cases of diphtheria resulting in one death. The one death referred to above is the only instance in which a death has occurred in a child who had been immunised.

Cheap Milk for Mothers and Young Children

Mr. DAVID ADAMS asked the Minister of Health whether it was intended to make the scheme for the provision of cheap milk for expectant and nursing mothers and children under school age general throughout the country; and whether its application for the six summer months only would be extended to the whole year in future.—Mr. HUDSON replied: It is the intention of the Milk Marketing Board and the Commissioner for the Special Areas that the schemes which have been in operation in Rhondda since July 17th, 1936, and in Jarrow since Jan. 1st, 1937, should run until Sept. 30th, 1937, but before that date the Board and the Commissioner will consider the results with a view to a decision on the future of the schemes.

TUESDAY, MARCH 16TH

Public Kitchens in Necessitous Areas

Mr. WILSON asked the Minister of Health whether, in view of the popularity which had attended the establishment of milk bars, he would consider the possibility of setting up in some of the more necessitous areas public kitchens where, at a small cost, the more nutritious kinds of food could be supplied either for consumption on the

premises or otherwise.—Mr. HUDSON, Parliamentary Secretary to the Ministry of Health, replied: I am afraid that the action proposed would not be within the powers of my department.

Expenditure on Mental Deficiency

Mr. WILSON asked the Minister of Health whether he was aware that the expenditure in respect of mental deficiency which had fallen upon the rates of county and county borough councils had risen from £694,390 in 1929–30 to £2,031,949 in 1932–33; and whether he could explain the causes for such an increase.—Mr. HUDSON replied: The figures quoted by the hon. Member do not represent the real position. The expenditure by local authorities amounted in 1929–30 to £1,500,244 and in 1932–33 to £2,191,847. An Exchequer contribution to the cost was paid in both years, in the former as a direct grant of 50 per cent. of expenditure, in the latter as part of the Block Grant. The increase in total cost shown by the figures I have quoted is due to the fact that it is a growing service and more attention is now being paid by local authorities to the matter.

MEDICAL NEWS

University of Oxford

Dr. H. M. Sinclair, lecturer in physiology and biochemistry in University College, formerly senior demy of Magdalen and Radcliffe scholar in pharmacology, has been elected to a travelling fellowship on the foundation of Dr. John Radcliffe.

Applications are invited by the Nuffield Committee for the whole-time post of assistant director of pathology to work at the Radcliffe Infirmary. The stipend offered is £1000 a year, and the committee will propose to the University that the title of Nuffield reader in pathology be conferred upon the assistant director. Further information about the post may be had from the secretary of faculties, University Registry, Oxford, to whom applications should also be sent before April 26th.

Mr. Humphrey Neame has been appointed examiner for the diploma in ophthalmology in place of Mr. P. G. Doyne.

Dr. Paul Fildes has been appointed examiner in pathology for the degree of bachelor of medicine in place of the late Prof. E. H. Kettle.

University of Cambridge

On March 12th the following degrees were conferred:—

M.D.—D. W. Smithers.

M.Chir.—W. H. G. Jessop.

M.B., B.Chir.—*F. G. Hinks, *F. B. Thomas, *B. L. Williams, *Alfred Rothwell, *D. G. Freshwater, *W. J. Montague, C. S. Humphries, A. D. Ledward, N. D. Jekyll, V. C. Robinson, E. G. K. Williams, G. I. Watson, I. C. Fletcher, B. C. M. Palmer, E. O. Walker, G. L. Broderick, H. D. Johnson, G. S. W. Organe, A. M. McFarlan, R. G. M. Keeling, and F. D. M. Livingstone.

M.B.—*S. J. R. Reynolds, *W. G. Brander, *L. T. Hilliard, *J. H. Stothert, *T. S. R. Fisher, *W. M. Beattie, J. C. Newbold, John Diver, J. R. Chambers, H. S. Wigfield, C. G. Batty-Smith, Charles McNeil, T. C. Larkworthy, C. J. Martin, and F. G. A. Beckett.

* By proxy.

The title of the M.B. degree has been conferred on M. Ball and of M.D. on A. M. Stewart.

University of Manchester

Dr. Stanley Hodgson has been appointed lecturer in forensic medicine and Dr. E. N. Rowlands chief medical assistant in the department of clinical investigations and research.

London County Council

On Tuesday Mr. Somerville Hastings was reappointed chairman of the Hospitals and Medical Services Committee, with Miss E. Rickards as his deputy. Dr. C. W. Brook resumes the chair of the committee on Welfare of the Blind.

Fellowship of Medicine and Post-Graduate Medical Association

The following courses will be given during April: ophthalmology at the Royal Eye Hospital (April 5th to 17th); plastic surgery (April 14th and 15th); neurology at the West End Hospital for Nervous Diseases (April 19th to 24th); Week-end courses will be held in diseases of the heart and lungs at Victoria Park Hospital (April 10th and 11th); in fevers at Park Hospital (April 17th and 18th); in infants diseases at the Infants' Hospital (April 24th and 25th); and in cancer at the Royal Cancer Hospital (April 24th and 25th). On Saturday, April 3rd, there will be a special demonstration on pulmonary tuberculosis (at Preston Hall), and on Tuesday, April 6th, there will be a demonstration on the fundus oculi, at 8.30 P.M. Both are intended for M.R.C.P. candidates. Detailed syllabuses of all courses can be obtained from the secretary of the Fellowship, 1, Wimpole-street, W.1.

Royal College of Surgeons of England

A meeting of the council of the college was held on March 11th with Sir Cuthbert Wallace, the president, in the chair. Mr. R. B. Wade of Australia was admitted an honorary fellow of the college. Mr. D. H. Patey was elected an examiner in pathology under the Conjoint Examining Board.

The following hospitals were recognised for the six months' surgical practice required of candidates for the final examination for the fellowship.

Victoria Hospital, Burnley (house surgeon to Unit I and II). Withington Hospital, Manchester (resident surgical officer; senior assistant medical officer, Grade 2; junior assistant medical officer, Grade 3). Prince of Wales's Hospital, Plymouth (resident surgical officer and three house surgeons); and at Devonport, (senior house surgeon for one year only); King Edward VII Hospital, Windsor (three house surgeons).

A diploma of fellowship was granted to M. H. B. Robinson and a diploma of membership to D. V. Hague. Licences in dental surgery were granted to the following candidates:—

G. M. A. Brown, A. J. Clegg, H. A. Dixey, F. B. Gamblen, Eileen F. Gawn, J. L. Harrington, B. J. Harrison, G. W. Lawrence, Frank McCombie, N. A. McCormick, K. J. Millett, E. A. Moore, W. R. G. Morris, Bankim Mukerjee, B. W. P. Roberts, N. L. Rowe, V. S. Sams, Jacques Schermant, E. C. Sharp, H. B. Shay, Melissa Sprowson, Kurt Strauss, J. E. Tudor, W. K. Weighell, W. D. Westoby, David Wolffe, and J. D. Wren.

Diplomas in ophthalmic medicine and surgery were granted jointly with the Royal College of Physicians to the following candidates:—

Aziz Ahmed, Edward Bacon, A. K. Banerjee, F. P. C. Claffy, F. J. Darbyshire, B. K. Das Gupta, G. S. Dhillon, M. M. A. Dubash, M. A. K. Durrani, R. L. C. Fisher, S. A. Foad, V. V. Gupte, Helen M. Herbert, R. F. Jamieson, Eileen M. Kennedy, H. M. Kera, Ram Labhaya, C. R. D. Leeds, B. N. Pershad, J. D. Maude, Kathleen A. Pih, S. M. Ruwala, Brendan Sheehan, E. C. Srinivasan, Jean W. Strand, K. J. Talbot, and B. D. Telang.

Jewish Hospital Medical Society

The Anglo-Palestinian Club will be at home to this society on Sunday, March 21st, at 8.30 P.M., at 43, Great Windmill-street, Piccadilly, for an evening of medicine, magic, music, and murder. Mr. Arnold Sorsby will be in the chair.

The Zunz Fund

The trustees of this fund, which was established in 1899, have offered to distribute its capital to 34 London hospitals in more or less the same proportions as the annual grants being hitherto made. The only condition is that the wards named after Annie Zunz which were supported by the annual grants shall be maintained in perpetuity. If the offer is accepted about £425,000 will be distributed.

Microchemical Club

At the annual general meeting of this club on March 13th, the following officers were elected: hon. treasurer, Mr. L. H. N. Cooper, Ph.D.; hon. secretary, Mr. J. R. O'Brien; hon. librarian, Miss Isobel Hadfield; members of committee: Prof. H. V. A. Briscoe, Mr. J. Matthew, and Mr. S. J. Folley, Ph.D.

London Hospital

The ordinary income of this hospital has slightly decreased, but it is expected that there will be a surplus of income over expenditure of about £4000, for the institution has received legacies amounting to over £48,000. It is, however, difficult to find funds for necessary capital improvements.

New Mental Hospital

On June 14th the Minister of Health will open a new mental hospital at Runwell, Essex, which is the joint scheme of East Ham and Southend-on-Sea. Its cost has exceeded £650,000 and it will house 1000 patients and is provided with all modern equipment, including a cinema.

London Homœopathic Hospital

At the annual general meeting a letter was read from the Keeper of the Privy Purse stating that the King had been pleased to grant his patronage to the hospital. Lord Donoughmore said that the past year had been a satisfactory one, since much work had been accomplished and the finances had not suffered.

A New Hospital for South London

A site has been acquired opposite the park in Lambeth-road for a new hospital to be erected by the Institute of Trained Nurses of Our Lady of Consolation. The present small hospital is in Barkham-terrace, for which site £10,000 has been paid. The new building is to cost £100,000.

Royal London Ophthalmic (Moorfields) Hospital

The annual dinner of this hospital took place on March 11th at the Langham Hotel, Mr. T. Harrison Butler presiding. In his response to the toast of The Medical School, Mr. C. B. Goulden, the dean, incorporated his report of the year's progress. He said that the school was flourishing and that students had joined the hospital in larger numbers than previously, there being 104 new students during 1936. The examination results had been also satisfactory. The Gifford Edmond prize had been awarded to Mr. J. Bruce Hamilton of Hobart, Tasmania, an old student and senior resident officer, for his essay on the significance of heredity in ophthalmology. Apart from continuous clinical instruction, 623 hours of lectures had been given. Mr. Fincham had delivered a series of lectures on modern ophthalmic instruments, and Prof. Bedson on allergy. Six series of demonstrations had been given to students of the Postgraduate College at Hammersmith. There had been several changes in the staff during the year. Sir Stewart Duke-Elder had resigned from the hospital, and Sir John Parsons, who had lectured on physiology since 1919, had also resigned his lectureship. To replace these the school had secured the services of Dr. R. J. Lythgoe, reader in physiology of the special senses in the University of London. Dr. Russell Brain had retired and in his place Dr. Denis Brinton had been elected to the staff. Mr. Frank Law had joined the staff and undertook the classes in practical surgery. Mr. C. D. Shapland had been appointed curator and pathologist, and Mr. R. C. Davenport was the new sub-dean. The school still felt the need of a proper professorial unit in which full-time officers could give more attention to the teaching. Under the present arrangement it was impossible to do more, and recently the help of chief clinical assistants had been obtained to give tutorial classes, and these had been much appreciated.

Appointments

ATKIN, I., M.D. Lond., D.P.M., has been appointed Deputy Medical Superintendent of Park Prewett Mental Hospital, Basingstoke.

DUNN, R. W., M.R.C.S. Eng., Resident Surgical Officer at Manchester Hospital for Consumption and Diseases of the Throat and Nose.

GORDON, IAN, M.B., M.R.C.P. Lond., Hon. Assistant Physician to the Aberdeen Royal Infirmary.

MARSHALL, G. P. M., M.B. Edin., D.P.H. Lond., Assistant School Medical Officer for Huddersfield.

MATTHEWS, D. N., M.B. Camb., F.R.C.S. Eng., Surgical Registrar at the Westminster Hospital.

ROPER, R. D., M.B. Camb., Hon. Anæsthetist to the Connaught Hospital, London.

TOD, MARGARET, M.B., F.R.C.S. Edin., D.M.R.E., Assistant Director to the Holt Radium Institute, Manchester.

St. Bartholomew's Hospital.—The following appointments are announced:—

CHANDLER, F. G., M.D. Camb., F.R.C.P. Lond., Physician;
DENNY-BROWN, D. E., M.B. N.Z., D.Phil. Oxon., F.R.C.P. Lond., Neurologist;
BURROWS, H. J., M.D. Camb., F.R.C.S. Eng., Assistant Orthopædic Surgeon;
KENSHOLE, H. H., L.D.S., Assistant Dental Surgeon; and
WALKER, D. GREER, L.D.S., Chief Assistant to the Dental Department.

CONVERSAZIONE AT THE UNIVERSITY OF LONDON

LAST Tuesday evening the chairman of convocation was at home to the graduates of the University and their friends. Over a thousand persons took the opportunity to see Mr. Holden's beautiful senate house block, of which the reception hall, panelled with travertine, is a remarkable example of warm academic hospitality. The other university buildings, including the library and great tower, are still in their early stages, but already London University has begun to feel like a home to its graduates—and even to its undergraduates. The guests were entertained on Tuesday with music, dance, and drama of a high grade, but the real attraction was the opportunity, of which free use was made, for graduates of all faculties to meet each other and the administrative staff of the University. Refreshment was comfortably served in various parts of the house and especially at the long tables in the long low refectory on the third floor.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
TUESDAY, March 23rd.
Medicine. 5 P.M. Dr. Stuart Blackmore: The Effects on the Respiratory System of Asphyxiating Gases.
Urology. 8.30 P.M. Clinico-pathological meeting. Specimens illustrating stones in the kidney and ureter will be shown.
WEDNESDAY.
Comparative Medicine. 5 P.M. Prof. S. J. Cowell, Miss Harriette Chick, D.Sc., Dr. Leslie Harris, Dr. J. T. Edwards, and Dr. H. H. Green: Nutrition and its Effect on Infectious Disease.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, W.
MONDAY, March 22nd.—8.30 P.M., Dr. Donald Hunter. Consideration of Some Occupational Diseases.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane road, W.
TUESDAY, March 23rd.—4.30 P.M., Dr. Gardiner-Hill: Endocrine Diseases and Disturbances.
WEDNESDAY.—Noon, clinical and pathological conference (medical). 2.30 P.M., Dr. A. Miles: Bacteriology of Urine. 3.15 P.M., clinical and pathological conference (surgical).
THURSDAY.—Noon, clinical and pathological conference (obstetrics and gynæcology). 2.30 P.M., Dr. Duncan White: Radiological Demonstration. 3.30 P.M., Mr. A. K. Henry: Demonstrations on the Cadaver of Surgical Exposures. 3.30 P.M., Prof. Daniel Dougal; Genital Prolapse.
Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics and operations, obstetrical and gynæcological clinics and operations.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.
MONDAY, March 22nd.—10 A.M., Dr. Post: Demonstration of X Ray Films, skin clinic. 11 A.M., surgical wards. 2 P.M., operations, surgical and gynæcological wards, medical, surgical, and gynæcological clinics.
TUESDAY.—10 A.M., medical wards. 11 A.M., surgical wards. 2 P.M., operations, medical, surgical, and throat clinics.
WEDNESDAY.—10 A.M., children's ward and clinic. 11 A.M., medical wards. 2 P.M., gynæcological operations, medical, surgical, and eye clinics.
THURSDAY.—10 A.M., neurological and gynæcological clinics. Noon, fracture clinic. 2 P.M., operations, medical, surgical, and genito-urinary and eye clinics.

NATIONAL HOSPITAL FOR DISEASES OF THE HEART, Westmoreland-street, W.
TUESDAY, March 23rd.—5.30 P.M., Dr. Maurice Campbell: Coronary Thrombosis.

HAMPSTEAD GENERAL AND NORTH-WEST LONDON HOSPITAL, N.W.
WEDNESDAY, March 24th.—4 P.M., Dr. C. Rickwood Lane: The Estimation of the Basal Metabolic Rate.

MANCHESTER ROYAL INFIRMARY.
TUESDAY, March 23rd.—4.15 P.M., Dr. W. Fletcher Shaw: Pruritus and Leucoplakia.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.
WEDNESDAY, March 24th.—4.15 P.M. (Victoria Infirmary), Mr. W. A. Sewell: Transurethral Treatment of the Enlarged Prostate.

Vacancies

For further information refer to the advertisement columns

Aberdeen Royal Infirmary.—Hon. Clin. Tutor.
Accrington, Victoria Hosp.—H.S., £150.
Aylesbury, Royal Buckinghamshire Hosp.—Second Res. M.O., at rate of £150.
Bangor, Caernarvonshire and Anglesey Infirmary.—Sen. and Jun. H.S., £150 and £100 respectively.
Barbados General Hosp.—Two Jun. H.S.'s, each £325.
Basingstoke, Park Prewett Mental Hosp.—Second Asst. M.O., £600. Also Jun. Asst. M.O., £350.
Bath, Royal United Hosp.—H.S. to Ear, Nose, and Throat Dept., at rate of £150.
Belgrave Hosp. for Children, 1, Clapham-road, S.W.—Two H.P.'s and two H.S.'s, each at rate of £100.
Birmingham, Monyhull Colony.—Res. Asst. M.O., £350.
Birmingham, St. Chad's Hosp.—H.P. and Anæsthetist, at rate of £150.
Bolton Royal Infirmary.—H.S., £150.
Bradford, Royal Eye and Ear Hosp.—H.S., £180.
Bradford Royal Infirmary.—Two H.P.'s, three H.S.'s, and Cas. H.S., each at rate of £150.
Burnley, Victoria Hosp.—H.P. and H.S., each at rate of £150.
Buxton, Devonshire Royal Hosp.—Research Worker in Rheumatic Diseases, £400.
Canterbury, Kent and Canterbury Hosp.—H.S., at rate of £125.
Carlisle, Cumberland Infirmary.—H.S., at rate of £155.
Cobham, Surrey, Schiff Home of Recovery.—Surgical Officer, at rate of £200.
Connaught Hosp., Walthamstow, E.—Cas. O., at rate of £100.
Derbyshire Education Committee.—Asst. School M.O., £500.
Doncaster Royal Infirmary and Dispensary.—Res. Anæsthetist, at rate of £175.
Dover, Royal Victoria Hosp.—Res. M.O., £180.
East Riding County Council of York.—Asst. County M.O.H., £500.
Edinburgh Royal Infirmary.—Jun. Asst. Radiologist, £250.
Epsom County Hosp.—Res. Asst. M.O., at rate of £375.
Evelina Hosp. for Sick Children, Southwark, S.E.—Ophth. Surgeon, 50 guineas.
Farringdon General Dispensary, 17, Bartlett's Buildings, E.C.—Hon. Physician.
Glasgow Royal Mental Hosp., Gartnavel.—Jun. Asst. Physician, £300.
Gloucestershire Royal Infirmary.—H.S., at rate of £150.
Grimsby County Borough.—Asst. M.O.H., £500.
Halifax General Hosp.—Med. Supt., £800.
Harrogate, Royal Bath Hosp.—Res. M.O., £156.
Hosp. for Consumption and Diseases of the Chest, Brompton, S.W.—Res. Surg. O. and Asst. Res. M.O., each at rate of £150. Also three H.P.'s, and H.P. for Frimley Sanatorium, each at rate of £50.
Hosp. of St. John and St. Elizabeth, 60, Grove End-road, N.W.—Res. H.S., at rate of £75.
Hove General Hosp.—Jun. Res. M.O., £120.
Hull City Hosp.—Jun. Res. M.O., £350.
Hull Municipal Maternity Home and Infants' Hosp.—Jun. Res. M.O., at rate of £100.
Indian Medical Service.—Commissions.
Isleworth, West Middlesex County Hosp.—Three Res. Asst. M.O.'s, each £400.
Jewish Maternity Hosp., Underwood-street, E.—Res. M.O., at rate of £50.
King's College Hosp., Denmark Hill, S.E.—Sen. and Jun. Asst. Radiologists.
Lancaster County Mental Hosp.—Asst. M.O., £500.
Leicester, County Sanatorium and Isolation Hosp., Markfield.—Jun. Res. M.O., at rate of £300.
Leicester Royal Infirmary.—Res. Radiologist, at rate of £200.
Liphook, Hants, King George's Sanatorium for Sailors.—Asst. M.O., at rate of £200.
Liverpool, Bootle General Hosp.—H.S. to Spec. Depts., at rate of £150.
Liverpool City Infectious Diseases Hosp.—Asst. Res. M.O., £250.
London County Council.—Two Res. Med. Supts., £1300 and £1100. Part-time M.O.'s, each £300. Asst. M.O., Grade II, £250. Temp. Dist. M.O. for Area VII, £160. Also H.P. and H.S., each at rate of £120.
London Hosp., E.—First Asst. to Neuro-surgical Dept.
London Lock Hosp., 283, Harrow-road, W.—Res. M.O. to Female Depts., at rate of £175.
Macclesfield, Cheshire County Mental Hosp., Parkside.—Asst. M.O., £350.
Maidstone, Kent County Ophthalmic and Aural Hosp.—Ophth. H.S., at rate of £200.
Manchester, Ancoats Hosp.—Res. M.O., at rate of £150.
Manchester, Christie Hosp. and Holt Radium Institute, Withington.—Res. M.O., at rate of £150.
Manchester City.—Asst. Tuber. O., £650.
Manchester Ear Hosp.—R.S.O. Hosp. registered for D.L.O. Salary £120 per annum.
Manchester, Monsall Hosp. for Infectious Diseases.—Res. Asst. M.O., at rate of £250.
Manchester, Withington Hosp.—Res. Asst. M.O., at rate of £300.
Mansfield, Harlow Wood Orthopædic Hosp.—H.S., at rate of £200.
Middlesbrough, North Riding Infirmary.—Cas. O., at rate of £150.
Newark General Hosp.—Res. H.S., £175.
Newcastle General Hosp.—Cons. Surgeon for Throat, Nose, and Ear Cases, £175.
Newcastle-upon-Tyne City Hosp. for Infectious Diseases.—Res. Med. Asst., £350.
Northamptonshire County Council.—County M.O.H. and Chief School M.O., £1100.
Northwood, Mount Vernon Hosp.—H.S., at rate of £150.
Nottingham and Midland Eye Infirmary.—Res. H.S., £200.
Nottingham City.—Asst. M.O. for V.D. Clinic, £500.
Oldham Royal Infirmary.—H.S., at rate of £175.
Preston and County of Lancaster Royal Infirmary.—Cas. H.S., £150.
Princess Beatrice Hosp., Earl's Court, S.W.—Hon. Clin. Assts. to Out-patients' Dept. Also Med. Reg.
Princess Louise Kensington Hosp. for Children, St. Quintin-avenue, W.—H.S., at rate of £120–£150.
Richmond, Surrey, Royal Hosp.—Jun. H.S., at rate of £100.
Royal Cancer Hosp., Fulham-road, S.W.—Second Asst. Pathologist, £250.
Royal Free Hosp., Gray's Inn-road, W.C.—Res. Cas. O., at rate of £150.
Royal Naval Medical Service.—M.O.'s.
St. Bartholomew's Hosp., E.C.—Asst. Physician.
St. John's Hosp., Lewisham, S.E.—Hon. Dermatologist.
St. Leonards-on-Sea, Buchanan Hosp.—Jun. H.S., £125.
St. Paul's Hosp., Endell-street, W.C.—Hon. Surgeons.
Salford City.—Asst. Maternity and Child Welfare M.O., £1 11*s.* 6*d.* per session.
Salisbury General Infirmary.—H.S., at rate of £125.
Samaritan Free Hosp. for Women, Marylebone-road, N.W.—H.S., at rate of £100.
Sheffield Children's Hosp.—H.P., at rate of £100.
Sheffield Royal Hosp.—Clin. Asst. to Ophth. Dept., £300.
Southend-on-Sea General Hosp.—H.P. and H.S., each at rate of £100.
South London Hosp. for Women, Clapham Common, S.W.—Surg. Reg., at rate of £75.
Stoke-on-Trent, Burslem, Haywood, and Tunstall War Memorial Hosp.—Res. H.P., at rate of £150.
Sunderland Royal Infirmary, &c.—Surgeon to New Orthopædic Dept. and Fracture Clinic.
Swanley, Kent, Hosp. Convalescent Homes, Parkwood.—Res. M.O., at rate of £200.
Swansea General and Eye Hosp.—H.P., at rate of £150.
Truro, Royal Cornwall Infirmary.—H.S., £170.
Wilts County Council.—Asst. M.O., £700.
Wimbledon Hosp., Thurstan-road, S.W.—Res. M.O., at rate of £150.
Winchester, Royal Hampshire County Hosp.—Hon. Anæsthetist.
Windsor, King Edward VII Hosp.—H.S., £100.
Wolverhampton Royal Hosp.—H.S. and H.S. to Orthopædic and Fracture Dept., each at rate of £100.
Wrexham and East Denbighshire War Memorial Hosp.—Two Res. H.S.'s, each at rate of £150.

The Chief Inspector of Factories announces a vacancy for a Certifying Factory Surgeon at Currie (Midlothian).

Births, Marriages, and Deaths

BIRTHS

BOULDEN.—On March 9th, at Canterbury, the wife of Dr. Peter Boulden, of a daughter.

BROWNING.—On March 10th, to Dr. and Mrs. S. Barratt Browning, at Wellington House, Handsworth Wood, Birmingham—a daughter.

DENNING.—On March 10th, at Hong-Kong, the wife of Captain G. M. Denning, R.A.M.C., of a daughter.

GRAHAM.—On March 14th, at St. John's Wood, N.W., the wife of Dr. Walter Graham, of a son.

LOWE.—On March 14th, at Lacock, Wilts, the wife of Dr. J. B. Lowe, of a son.

MCLEOD.—On March 9th, at North Walsham, Norfolk, the wife of Dr. T. H. McLeod, of a daughter.

SMELLIE.—On March 7th, at Sherwood, Woking, the wife of Mr. W. B. Smellie, F.R.C.S., of a daughter.

MARRIAGES

BALL—PEARSON.—On March 9th, at St Marylebone Parish Church, Peter H. Ball, R.A.M.C., only son of Dr. C. Ball, of Hunstanton, Norfolk, to Mary le Geyt, younger daughter of J. R. Pearson, C.I.E., late I.C.S., of Jersey.

DEATHS

ALEXANDER.—On March 14th, at Bankside, Teddington, Frederick William Alexander, O.B.E., M.R.C.S. Eng., D.P.H., aged 78.

BLAIR.—On March 14th, at Hillfield, Underhill-road, Cleadon, Ernest Blair, L.R.C.P. Edin.

BUSWELL.—On March 13th, at Prince of Wales-terrace, Kensington, W., Colonel Ferberd Richard Buswell, C.M.G., R.A.M.C. (retd.), aged 72.

GALE.—On March 14th, at Taswell-road, Southsea, Hants, Lieut.-Col. Robert Gale, D.S.O., M.B. Glasg., R.A.M.C. (retd.).

SCOTT.—On March 12th, at Fair Lea, West Cliff-road, Bournemouth, Bernard Scott, M.R.C.S. Eng., aged 78.

WENYON.—At Skailbrae, Dundee, on Feb. 20th, 1937, Edwin James Wenyon, M.B., M.R.C.S., aged 84 years.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

NOTES, COMMENTS, AND ABSTRACTS

SCIENTIFIC RESEARCH IN INDUSTRY

ONE of the most important developments in industrial research in the last five years has been the formation of well-balanced teams of workers—including chemists, physicists, engineers, and, where necessary, biologists—whose steady march has replaced the sporadic bursts of brilliant individualists. The Coöperative Research Associations are the main outcome of this movement and an encouraging summary of their work has been published in the report for 1935–36 of the Department for Scientific and Industrial Research.[1]

Many of the activities of the department are more or less directly connected with public health. There have been, for example, many advances in the campaign against noise. Besides the investigation on the problems of sound-proof buildings, tests have been carried out at the National Physical Laboratory on the reduction of noise from aircraft engines, large electrical transformers, road drills, and traffic. An investigation has also been begun on the production of static electricity in operating theatres of hospitals. In dry countries the ignition of explosive anæsthetics by sparking is recognised as a serious risk and it was considered important enough in this country to be investigated; experiments are being made on hospital equipment with the help of the medical authorities. At the request of the Home Office a preliminary examination has also been undertaken of the risk of ignition in dry-cleaning works where some of the liquids produce an ignitable vapour when mixed with air. Methods for detecting in the atmosphere small quantities of poisonous gases commonly occurring in certain industrial processes have also been worked out.

Researches for the Dental Board on dental amalgams have been completed during the year. The results have shown that the composition of the alloy used in making the amalgam must lie within very narrow limits if the dentist is to produce fillings that will continue to fill cavities without contraction. The precautions to be observed by the dentist in preparing the amalgam have also been established. The conditions for both the manufacture and use of materials for amalgam fillings have been determined as the result of an extended series of experiments, in which the changes of volume at mouth temperatures have been measured, sometimes over long periods. The report claims that the results of this work if generally applied should place this country ahead of the rest of the world in this particular aspect of dentistry.

Interesting physical work has been carried out in connexion with radium-beam therapy. The strength of the radiations from a specially designed radium unit, with which varying radium-skin distances can be obtained, have been measured in a "phantom," a celluloid vessel containing water and giving the same scattering and absorption effects as the human body. Means have been developed for accurately measuring and controlling tissue-dosage during treatment. Another investigation is in progress on the weak radiations that may reach distant parts of a patient's body during treatment. These, it is believed, may be important in contributing to the constitutional effects of radium therapy.

The Food Investigation Board has made several interesting observations. At the Low Temperature Station, Cambridge, the effect of radiation from radioactive substances in destroying bacteria are being studied in connexion with the storage of meat. Owing to their great penetrating power, it is possible to study the effects of γ rays on bacteria grown in nutrient media, and experiments on *Bacillus coli* have shown that the lethal action of the radiation proceeds independently of growth in the medium. Under certain conditions abnormally long forms of *B. coli* are produced; analysis of viable and total counts and of measurements indicate that the production of these is due to division being inhibited, while growth itself is unaffected. The flesh of eels has been found to be an unusually rich source of vitamin A which, however, is distributed unevenly throughout the body, being largely concentrated in the tail. Methods of storing eggs in different concentrations of carbon dioxide are being tried out on a large scale; a high concentration of about 60 per cent. was found to prevent attack by mould. The manner in which the quality of pork and bacon is related to the diet of the pig is being studied. In the diet, an ounce of cod-liver oil a day may be good for the living pigs, but it causes the fat to become rancid in curing, even when administration was stopped some considerable time before killing. Heavy exercise before slaughter makes the pig's tissues more alkaline, a fact that has been found to be important in dry salt curing, for alkalinity inhibits the diffusion of salt and sugar and predisposes to infection by the anaerobes that produce "bone-taint." By methods shown to be successful on a large scale and already adopted by several factories, pollution by milk washings can be decreased by about 98 per cent. It has been found that the losses of milk, cream, whey, &c., can be reduced by nearly three million gallons a year. This recovered milk is used for manufacturing purposes, thus saving about £50,000 a year to the industry.

The Boot and Shoe Research Association is making very careful records of the way in which various people walk, by means of cinematograph records and by measuring with electrical thermometers the skin temperature of the feet when wearing different types of shoes. Various gaits and the effect of different kinds of shoe upon them are also being investigated. The results suggest that some shoes, usually considered suitable, are much more likely to interfere with the normal gait than others, and this is throwing light upon the essentials of correct shoe design and construction.

In spite of the many advances, the report, however, still regards the position of the research association movement as a whole as not yet entirely satisfactory. The department is prepared to provide a further £66,000 each year to the support of these associations, and would have found that sum in each of the past two years had industry been ready to make an equivalent contribution. In fact, the income of the associations might have been increased by a further £150,000 a year, of which only half had to be found by industry, if full advantage had been taken of the department's offers.

[1] H.M. Stationery Office. 1937. Pp. 195. 3s.

A QUESTION OF EMPHASIS

Dr. G. G. SHERRIFF (Edinburgh) writes: "The interesting article last week on medicine in Russia raises wider issues worthy of discussion. The key section was the following: 'The primary concern of the medical service in the U.S.S.R. is not with hospitals or with diseases and their cures but with the maintenance and improvement of the health of the community. The care of the sick and their disposal to hospital becomes a subsidiary function. In the public mind the emphasis has thus been shifted away from the idea of disease toward that of health, which in itself helps to promote a healthy society.'—Although the more enlightened members of the profession in this country continually preach the need for the above change of emphasis, the status quo is little altered. All the power and glory still belong to the experts in disease. The higher degrees and diplomas so necessary for high preferment are based overwhelmingly on disease and the minute, even pedantic, study of its protean forms. Analysis flourishes, but synthesis languishes, an exile from most curricula and syllabi, those cast-iron portals on the path of progress. Until this radical defect is remedied the nineteenth century outlook will retain its predominant influence."

THE GREATEST EGYPTIAN MEDICAL DOCUMENT

HIPPOCRATES, whom we Europeans call the Father of Medicine, lived in the fifth century before Christ, and was according to Greek tradition born some nineteen generations after the deification of Æsculapius; that is about six hundred years after the profession had its origin. The earliest Greek tradition, however, with which we are acquainted, that of Homer, did not recognise Æsculapius as a god, but simply claimed him as a "blameless healer" inspired by the God of Healing, Pæon. But the Greeks themselves were a young people compared with the nations of the East, and in fact obtained a great, indeed probably a major, portion of their culture from the ancient Empires of the East. And so Dr. Ebbell dedicates his translation of a great Egyptian medical work [1] to the physician Imhotep, the acknowledged father of Egyptian medicine.

The Papyrus Ebers can be dated with considerable accuracy to about the year 1550 B.C., that is some 350 years before the siege of Troy, and at least 1000 years before the date of Hippocrates. But even that was not the beginning. There is extant another Egyptian papyrus which can be dated between three and four hundred years earlier, and the Papyrus Ebers itself contains references to written documents which were a thousand years old when it was compiled. So the trail runs backward: nor is it probable that the art of healing, which must have been one of the earliest professions to arise so soon as men had learnt to live with their fellows in communities, would not have been committed to writing directly written communication was invented. As the corpus of knowledge and the numbers of aspirants increased some permanent record of medicinal lore became inevitable. What was the ultimate source from which the Egyptians drew their knowledge of medicine is not and probably never will be known, but this much at least is certain, that the Papyrus Ebers represents the accumulated medical wisdom of many centuries.

What then does orthodox medicine of 1550 years before Christ look like to us nowadays? Dr. Ebbell has done his best for us with this translation and his learned and ingenious interpretations of what is only too often obscure. In the course of years of study he has succeeded in finding probable interpretations for many of the words which were unknown to the Egyptologists of fifty years ago when the Papyrus first came to light. Ebers bought it in Egypt in 1873 and printed it in full in 1875. But there still remains a large amount of words, expressions, references, and even whole sentences, the meaning of which is obscure. Yet enough has been securely transferred to our modern tongue to enable us to assert the existence of a body of medical and surgical knowledge founded on careful observation. One section reads thus: "The beginning of the physician's secret: knowledge of the heart's movement and knowledge of the heart. There are vessels from it to every limb" . . . "the heart speaks out of the vessels of every limb." The surgeon is told: "If thou examinest an oozing swelling of the male genitals . . . and if thy finger examines, and the swelling is like [an unknown word] under thy fingers and it slips away, then thou shalt say concerning it: it is a swelling of the male genitals: it is a disease which I will treat by an operation. Thou shalt bandage him with grease and treat as one treats wounds in any limb of a man." This Dr. Ebbell interprets as instructions for the operative treatment of a hydrocele.

The greater portion of the treatise is however occupied with the appropriate remedies for the relief of symptoms, such as cough, pain in the belly, worm-disease—Dr. Ebbell believes that they knew of the worm which we call bilharzia, and also of the *Anchylostomum duodenale*—spitting of pus, asthma, that is shortness of breath, dropsy, and so on. And it is here that once more we find that there is no new thing under the heavens. Among much which is obsolete and much that cannot now be understood, there are many of the drugs and minerals which the doctor of to-day still uses freely: senna and castor oil; calamine and antimony; colocynth and hyoscyamus. We read: "Remedy to cause purgation: senna pods and fruit of colocynth are ground fine, put on honey and eaten by the man and swallowed with sweet wine." A remedy for blisters on the limbs consists of pine-tar, turpentine, an unknown substance, cuttle-bone, yellow ochre ground fine with water and applied as an ointment—and probably quite as efficacious as any modern prescription for a bullous eruption.

Dr. Ebbell and his publishers in Copenhagen and here have earned a debt of gratitude in thus enabling the modern profession to realise something of what we owe to the long line of our precursors which stretches out to the earliest dawn of history and the dim recesses of prehistoric ages.

[1] The Papyrus Ebers. Translated by B. Ebbell, late County Medical Officer. Copenhagen: Levin and Munksgaard; London: Humphrey Milford, Oxford University Press. 1937. Pp. 135. 15*s*.

HOME CARE OF THE MENTAL PATIENT

FROM Holland, where much attention is paid to the home conditions and occupations of the patient with unbalanced mind, comes (in English) [1] a simple description of mental disorder designed for the lay rather than for the medical man. The words "psychosis" and "neurosis" are never mentioned, but brief accounts of the common types of mental and neurotic abnormalities are given—too brief perhaps to be of much use to those who are struggling with the serious problem of an acutely ill or a chronically demented patient at home. Dr. Querido's clinical descriptions, though brief, are provocative. He includes all the psychoneuroses under the general title "disharmonic personalities," and then divides them into "tyrants" and "shirkers." These terms are not, perhaps, inappropriate but we doubt whether it is wise to use them in a book for laymen, since they may well intensify the moral stigma often associated with these conditions. It is to the trained rather than to the untrained attendants of mental patients that we would commend this book.

CANCER FICTION

David Cannon was the leading surgeon in Manchester or some such place.[2] He found that an implanted or spontaneous tumour in a rat could be cured by inoculating the animal with a living emulsion of cells from a rat tumour of lower virulence, especially if the inoculum were briefly titillated with weak X rays. Applying these results to man, Cannon and his enthusiastic assistants, fortified with vast libations of tea, coffee, beer, and whisky, treated more than 100 cases of hopeless breast cancers in less than ten months and cured all of them; they also cured two melanotic sarcomas, one of which Cannon had, out of revenge, produced by inoculation. The results were finally announced to a crowded meeting in the great hall at B.M.A. House which received them with great applause. Such is the outline of a bright, well-told tale of hospital life in which there is nothing that is quite impossible and, making allowance for artistic exaggeration, little that is highly improbable. It will amuse most doctors and nurses, and there will be a good deal of difference of opinion as to whether fiction is a fit vehicle for the subject matter.

[1] Home Care of the Mental Patient. By Dr. Arie Querido, Head of the Department of Social Psychiatry, Medical Service, City of Amsterdam. London: Humphrey Milford, Oxford University Press. 1936. Pp. 93. 2*s*. 6*d*.

[2] A Crab was Crushed. By Harvey Graham. London: Rich and Cowan Ltd. 1937. Pp. 281. 7*s*. 6*d*.